

SECRET OFFICIAL

1/332

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10/067140

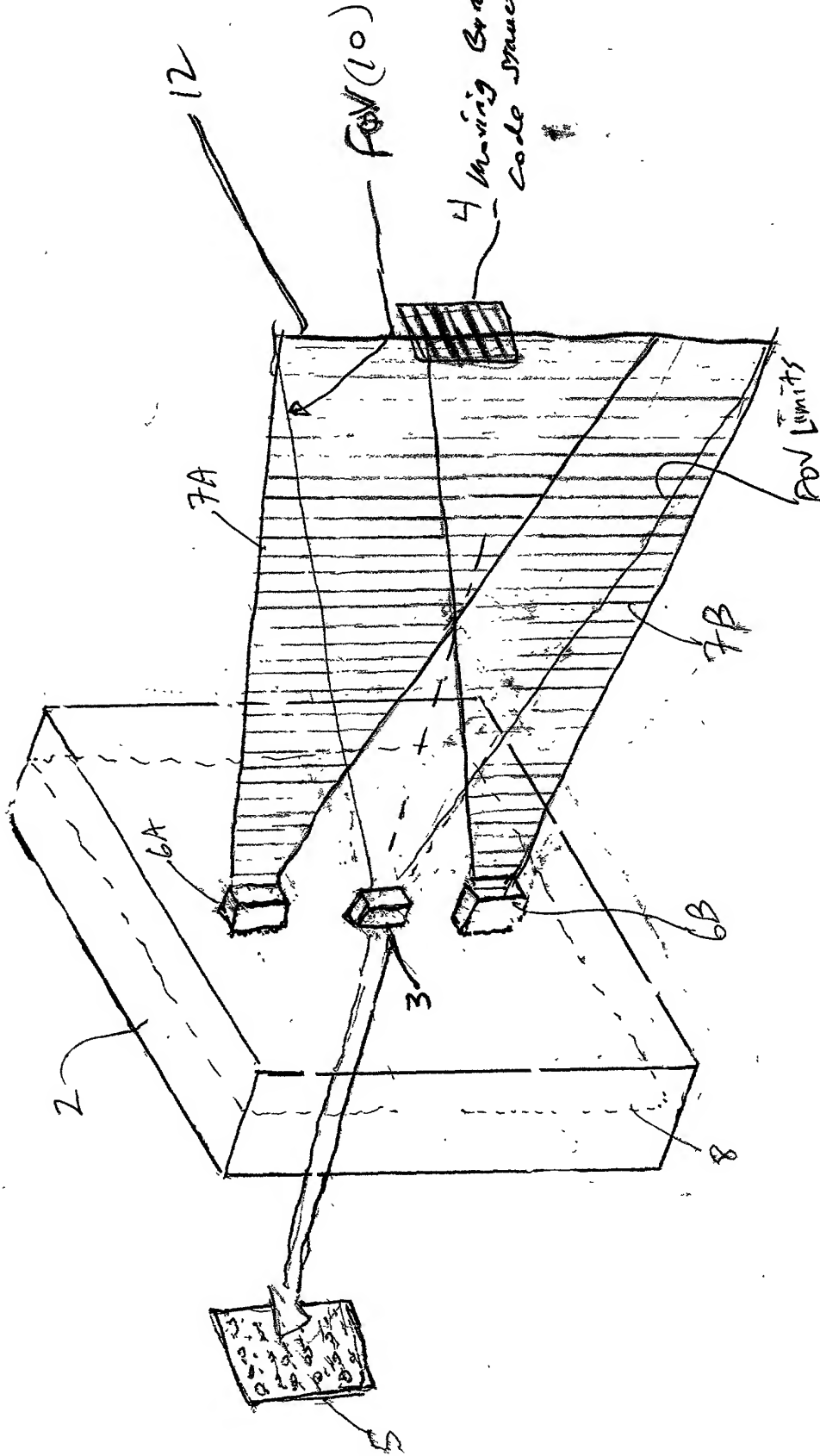
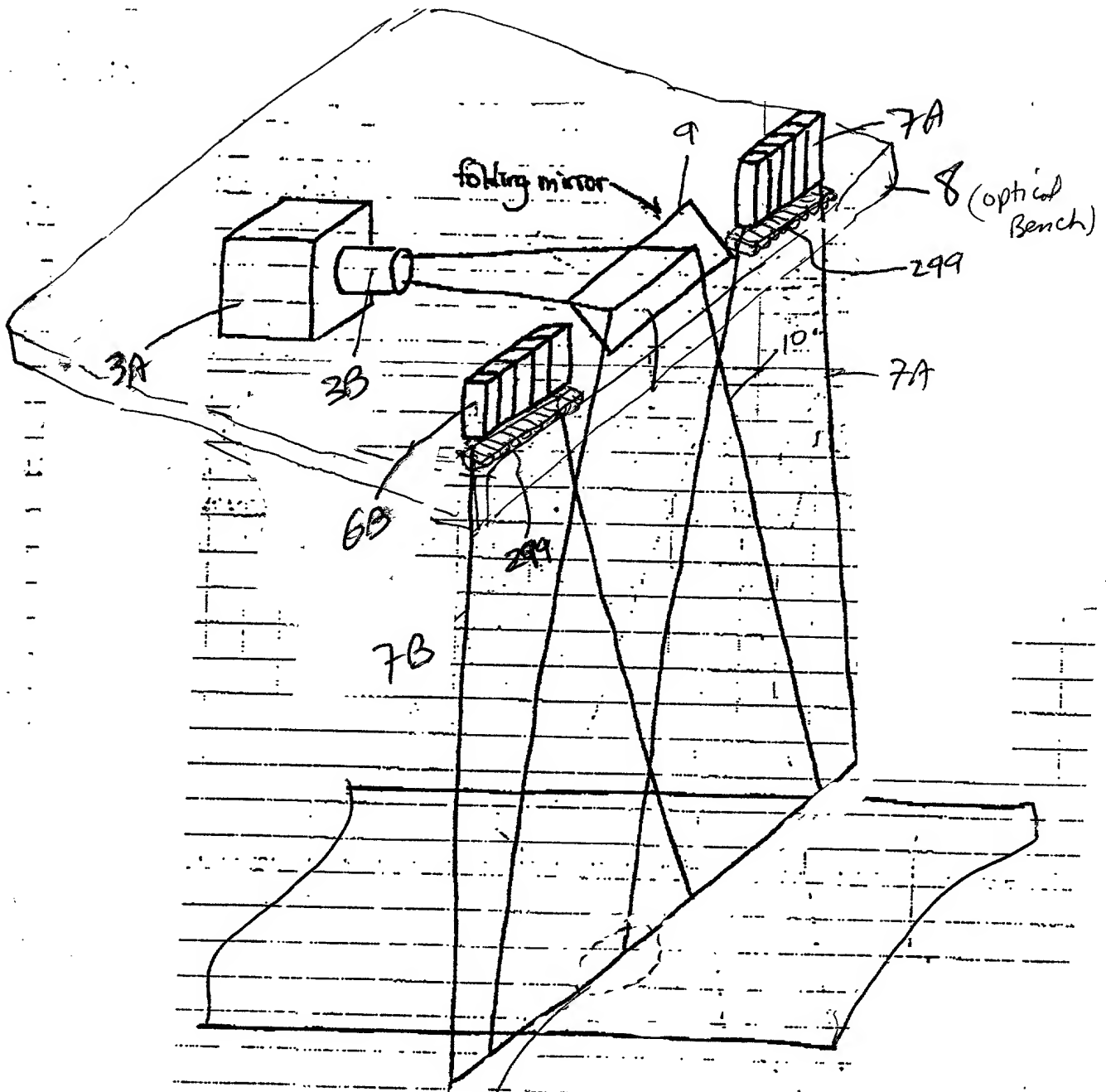


FIG 1A



↑  
1A

FIG. 1B1

Magnified Field of View of  
CCD sensor element on  
object  
width of projected  
Planar laser illumination  
beam on  
object

FIG. 1B3

10067440-020402

FIG. 1B2

- (1) Fixed focal length camera lens
- (2) Fixed fixed distance

Linear (1D) detector array

Module housing

Planar laser illumination beam undergoes micro-movement

XIS

1A

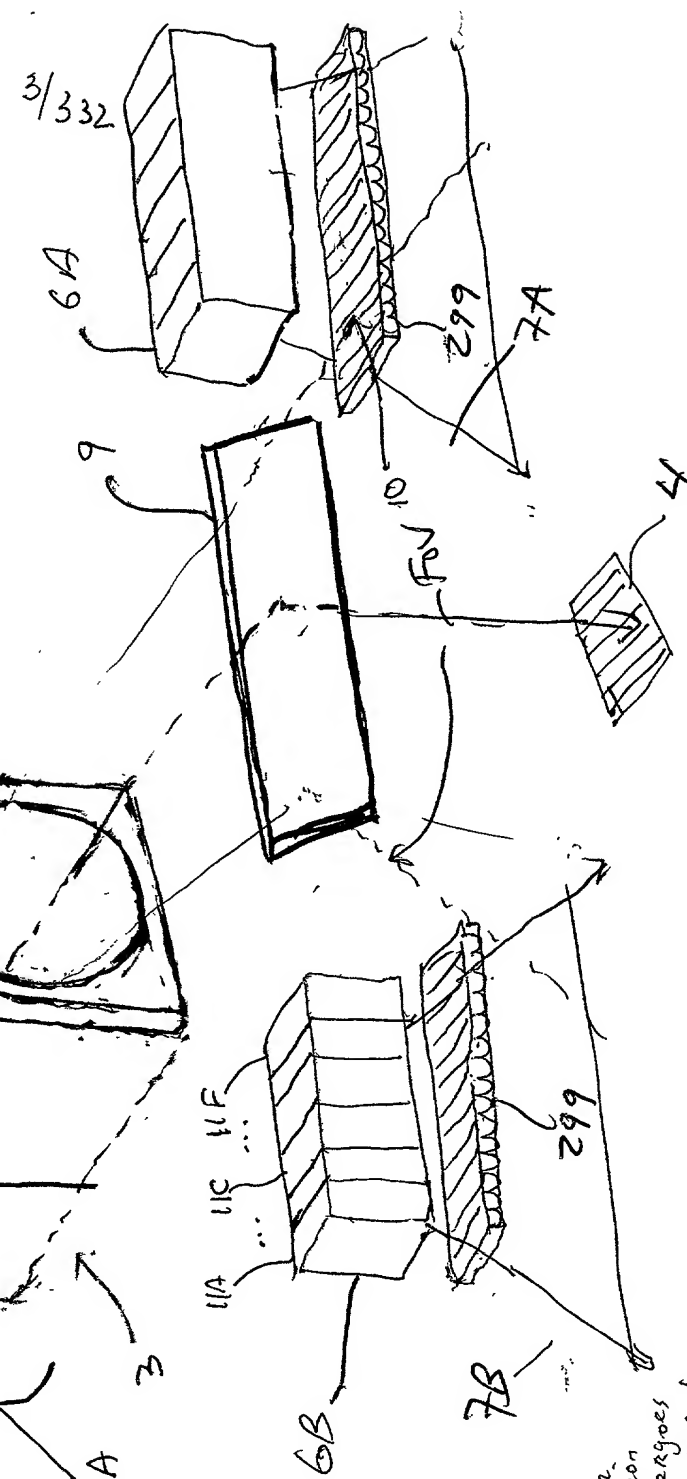
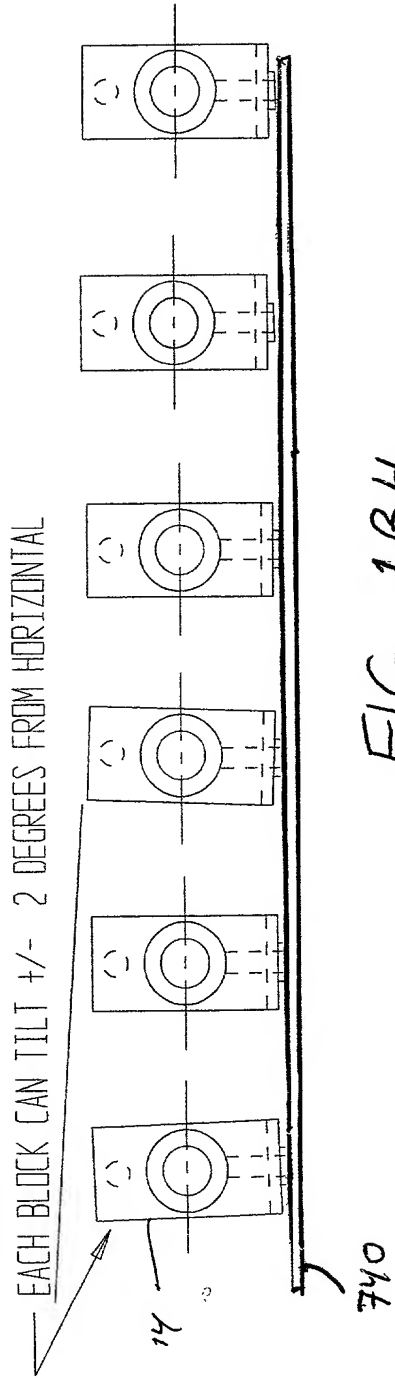
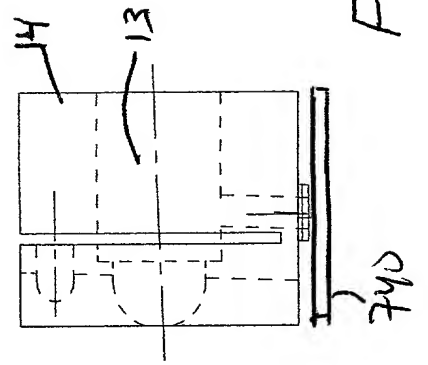


FIG. 1B2

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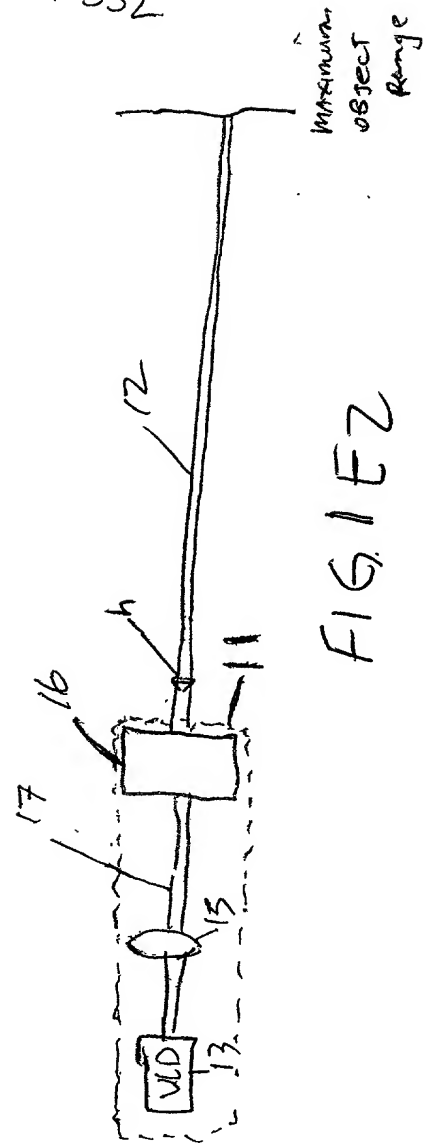
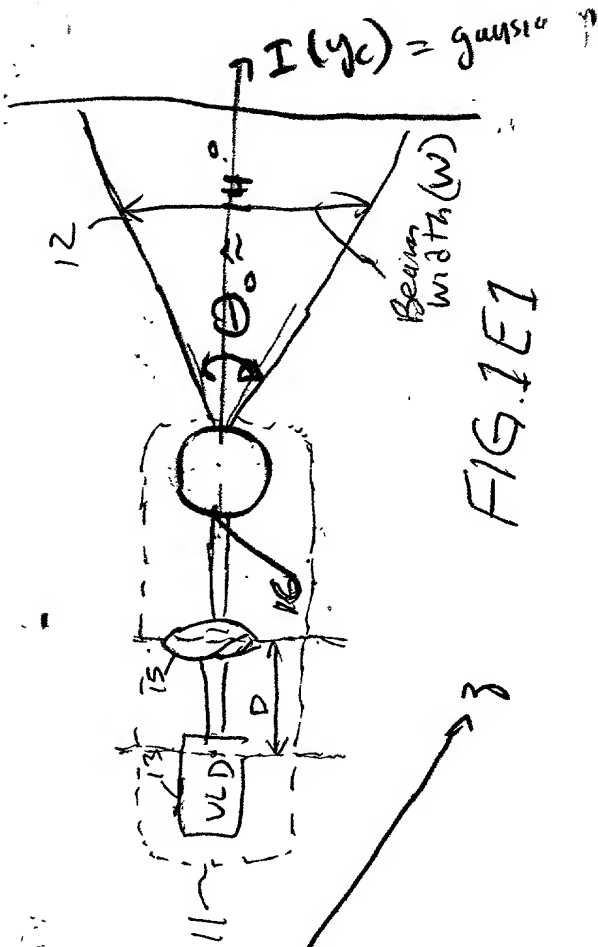
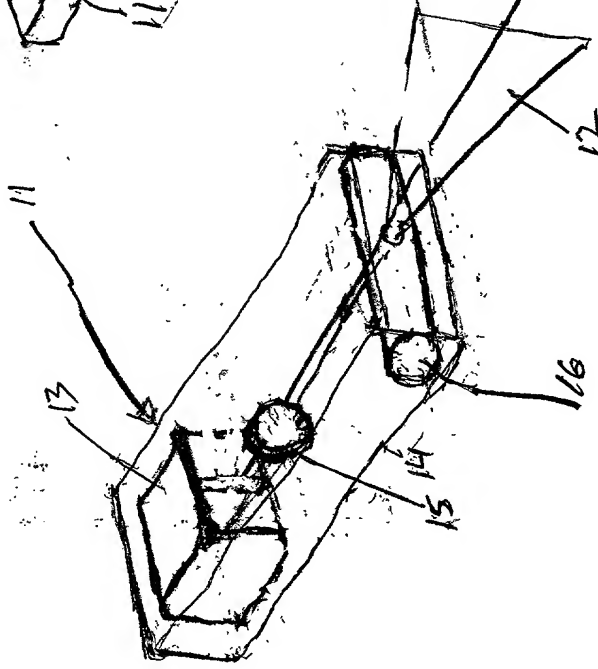
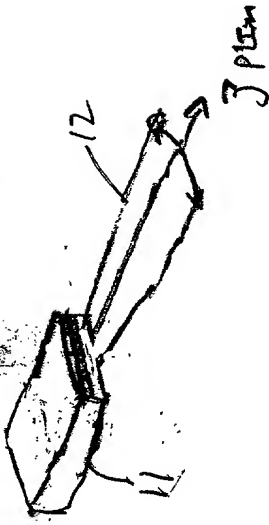


VLD BLOCK CAN PITCH FORWARD FOR ALIGNMENT WITH OTHER VLD BEAMS

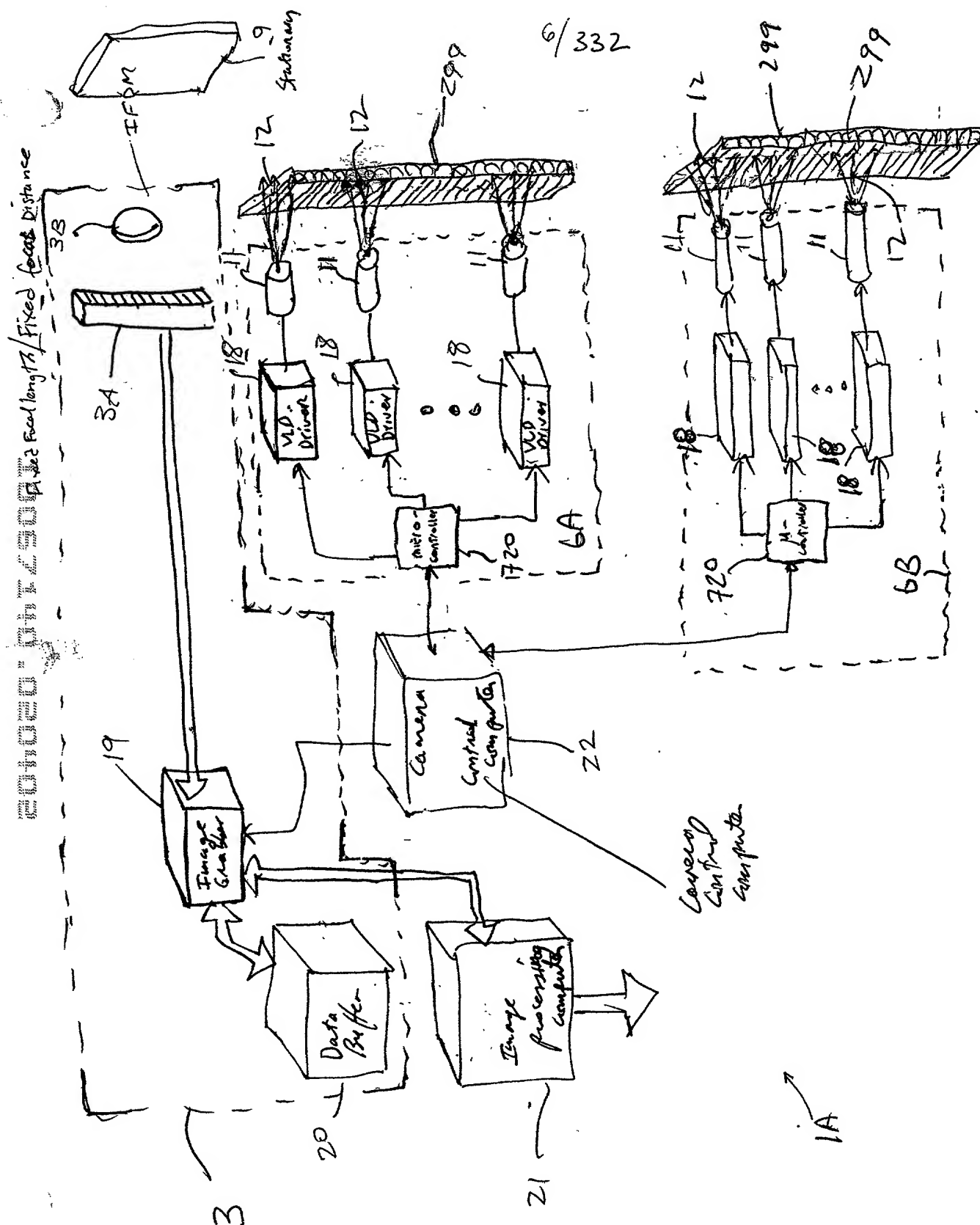


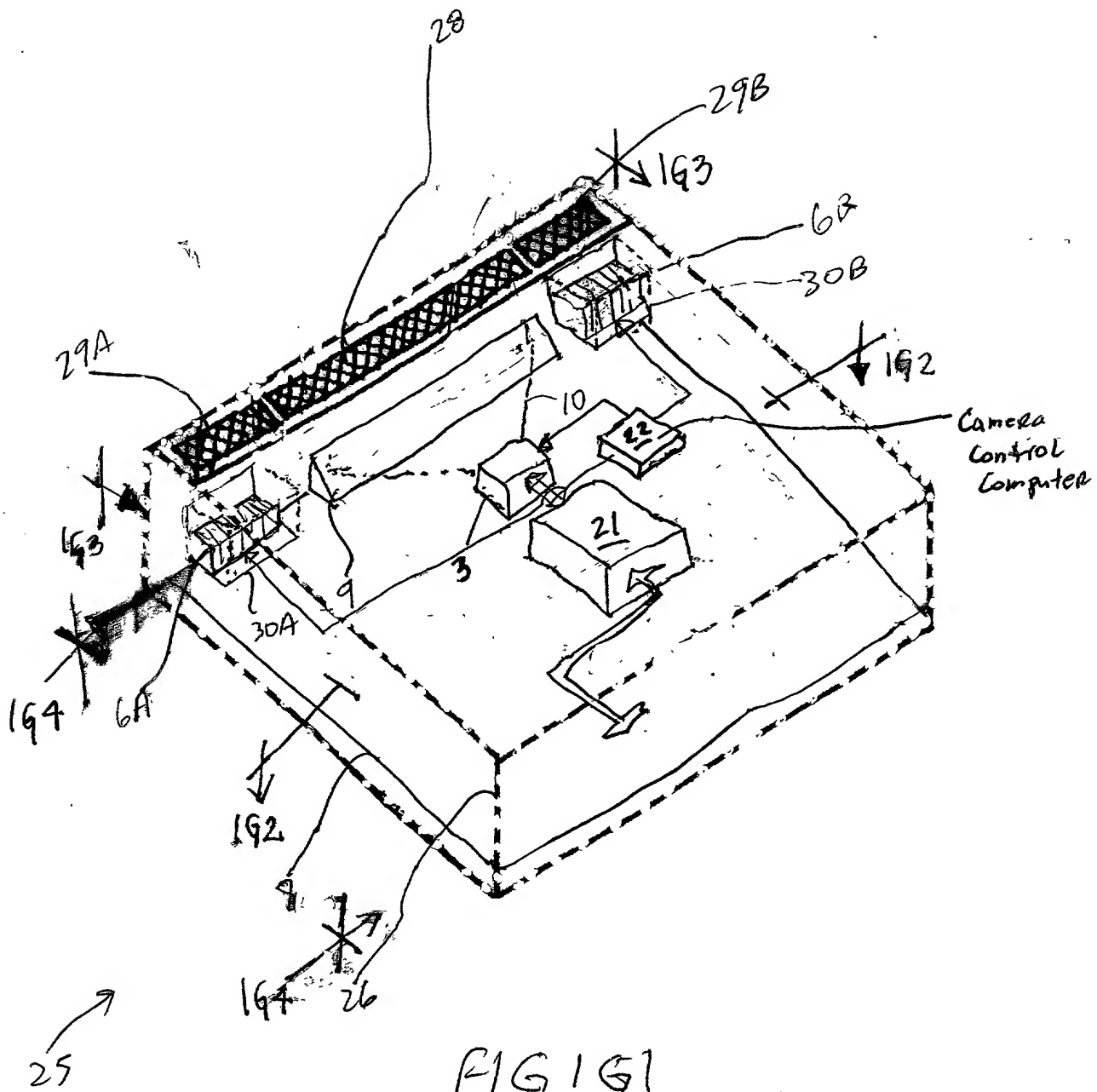


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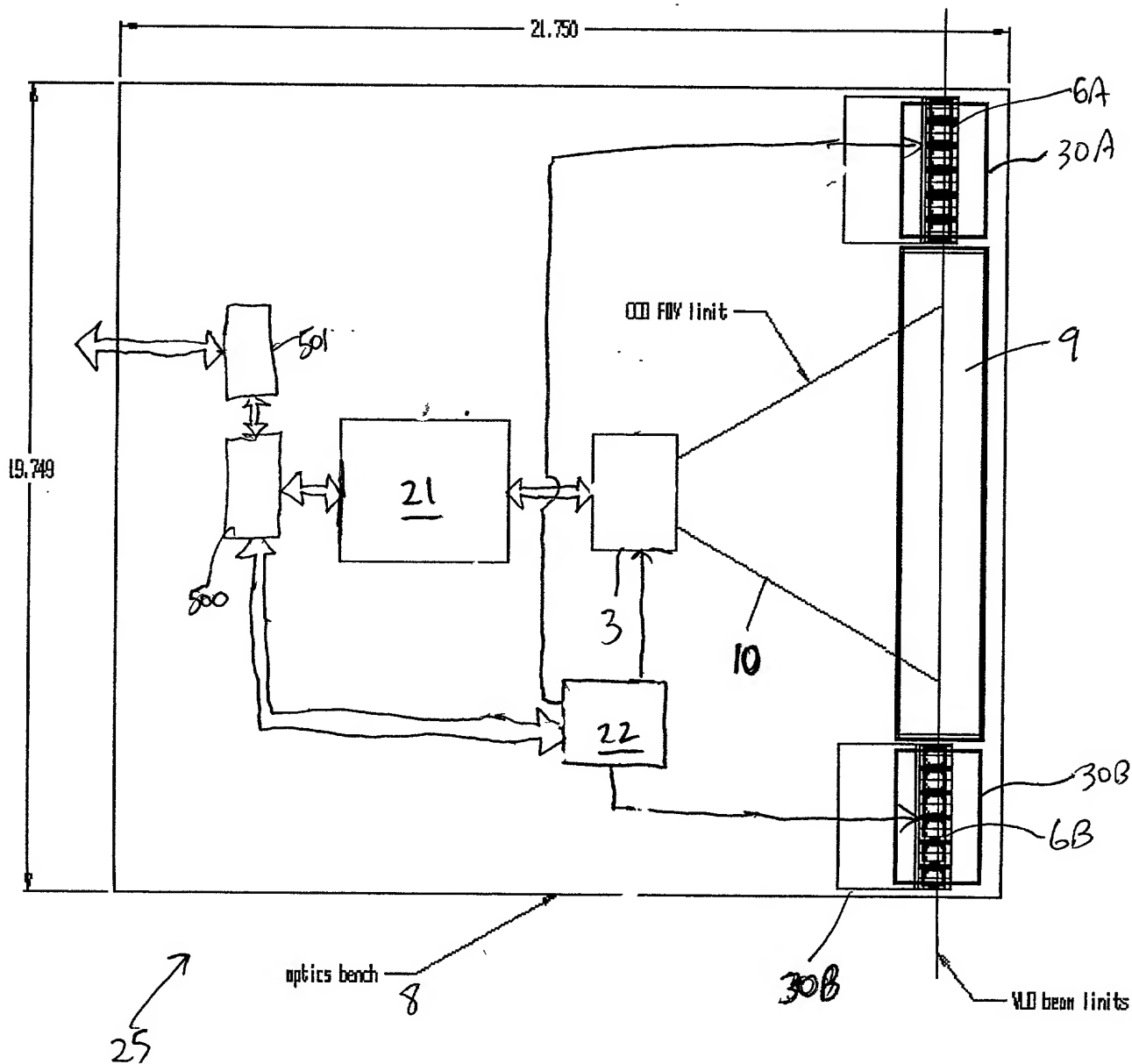


FIG. 1G2

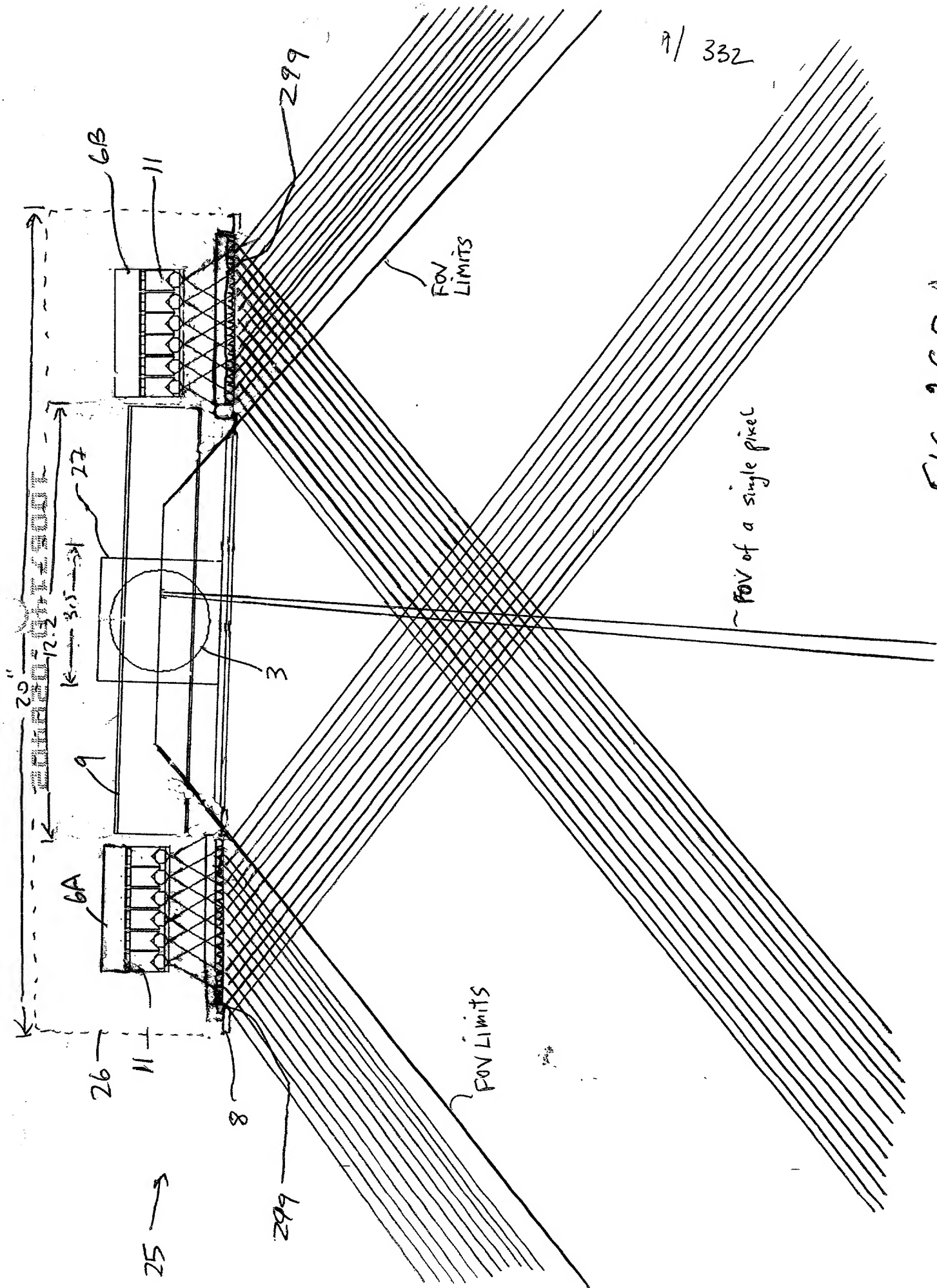


FIG 1G3

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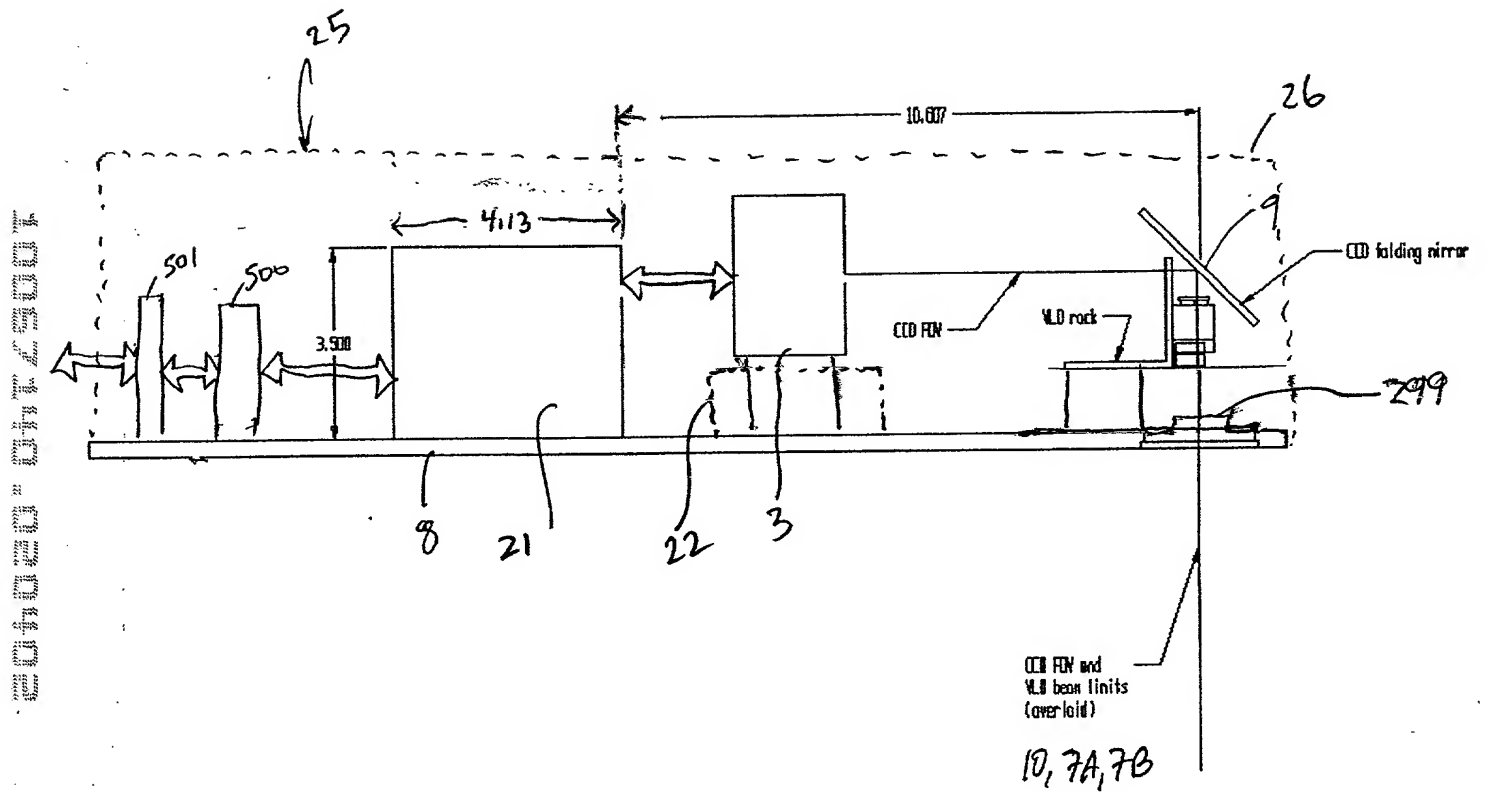
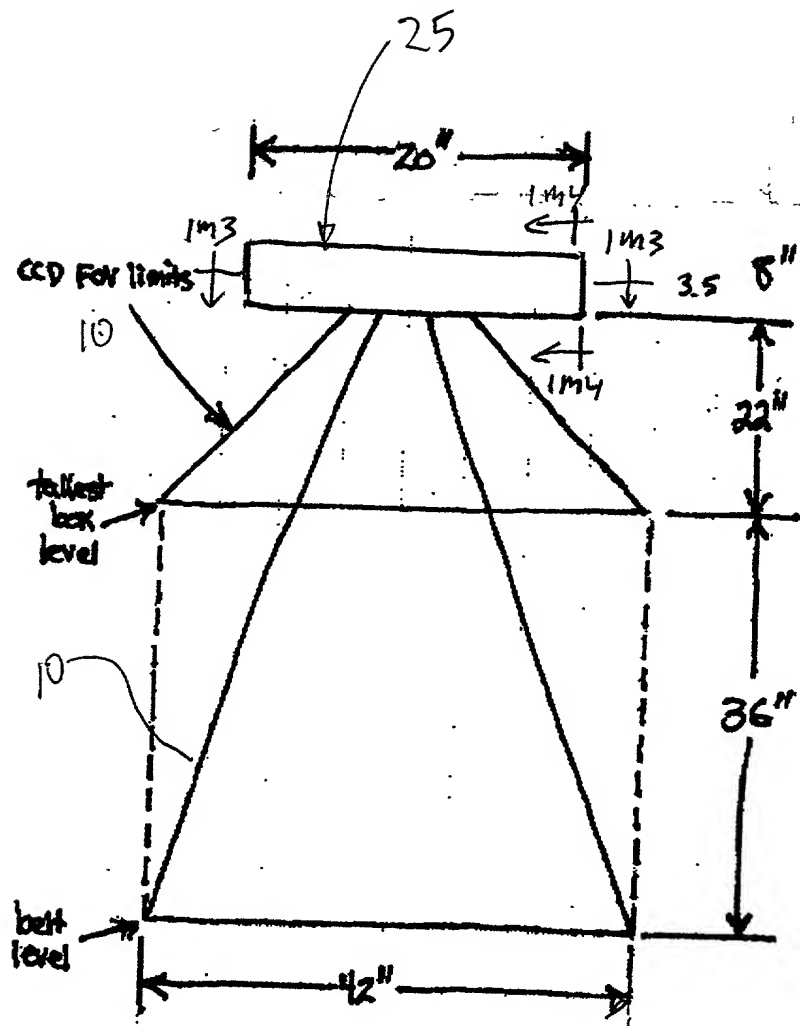


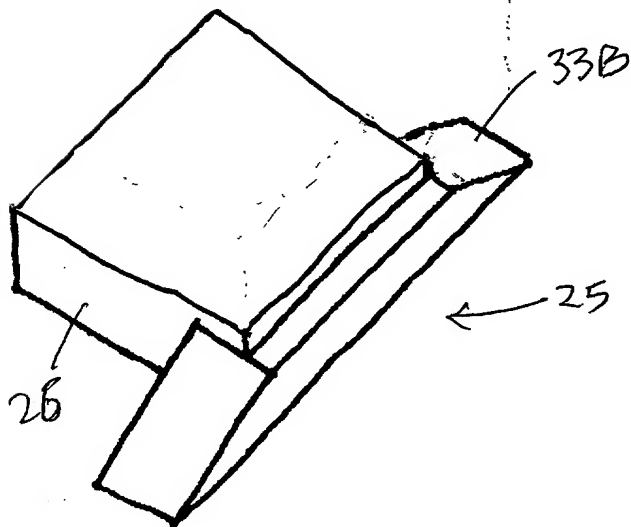
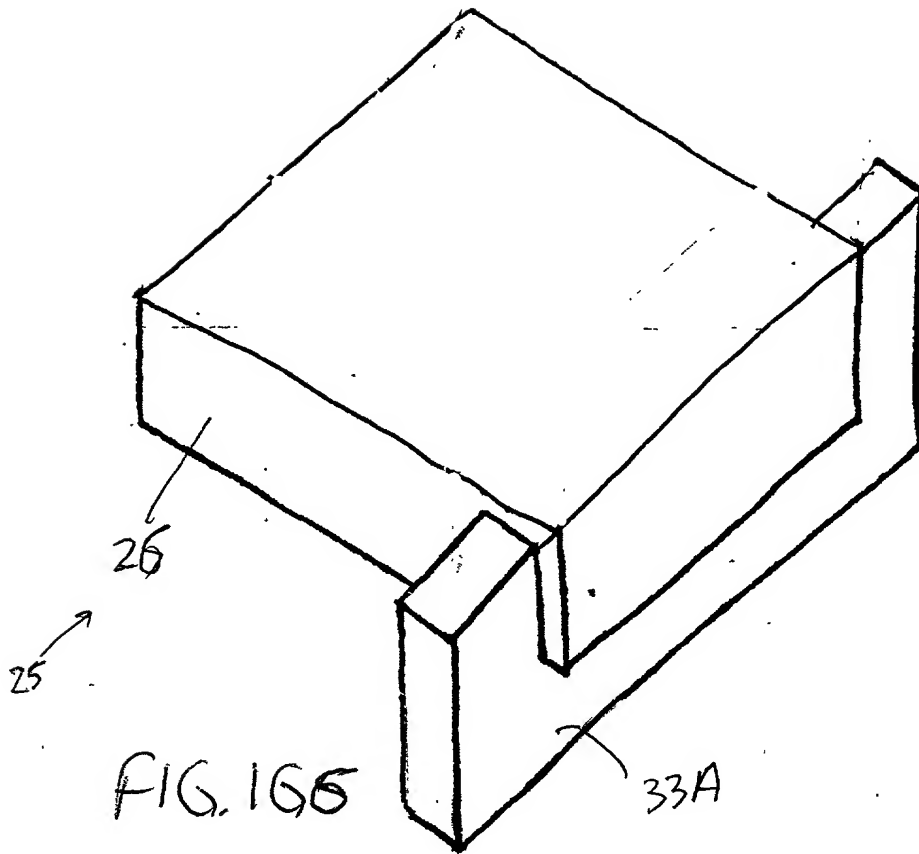
FIG. 164

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\* Fixed Field of Field

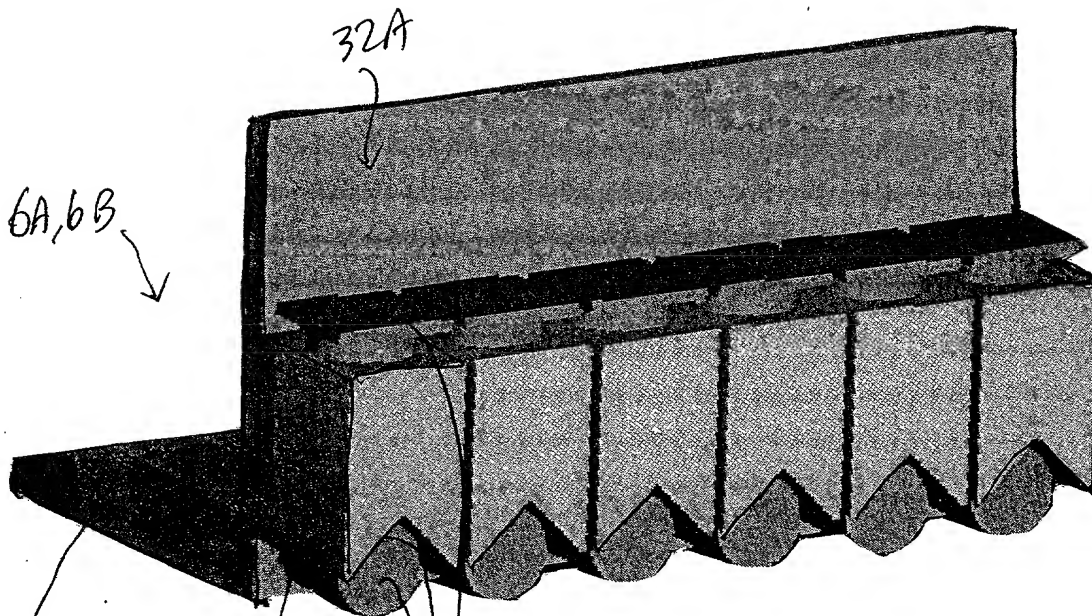
FIG. 1G5





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6A, 6B



32B

14

16 13 L bracket 14B

FIG. 1G.8

VLD sticking out of block

13

14 block

cylindrical lens 16

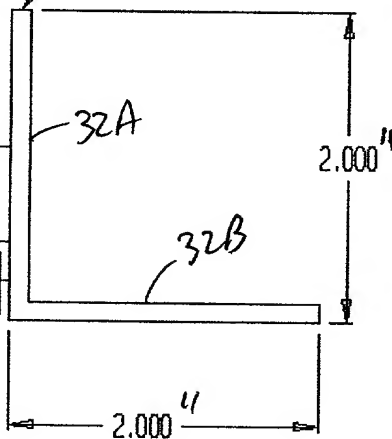


FIG. 1G.9

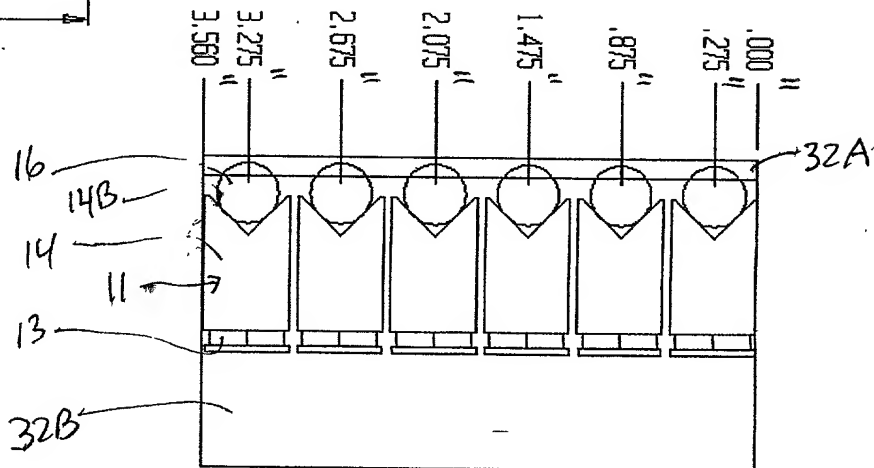


FIG. 1G.10

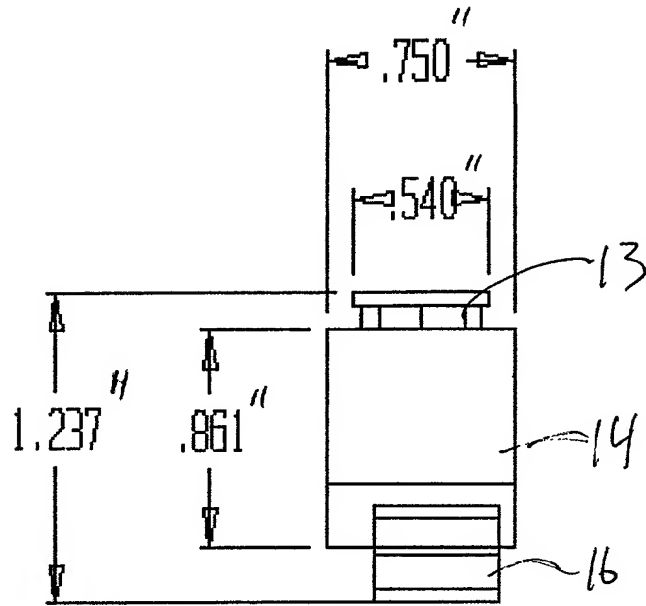


FIG. 1611

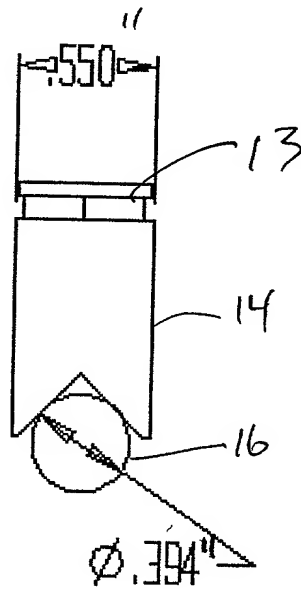


FIG. 1612

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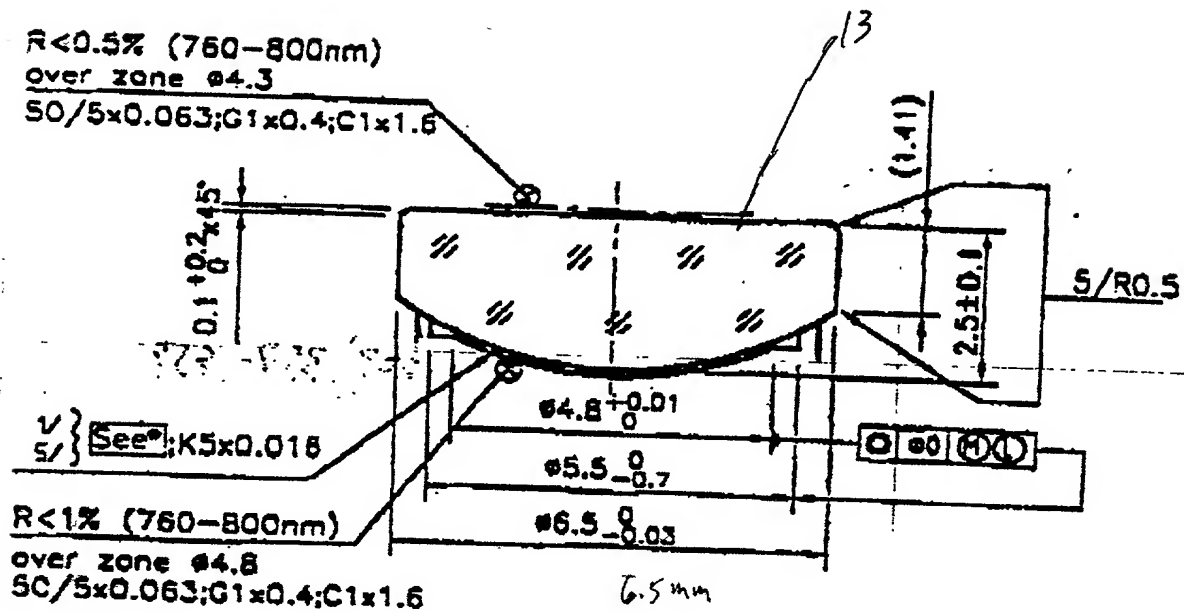


FIG. 1G13

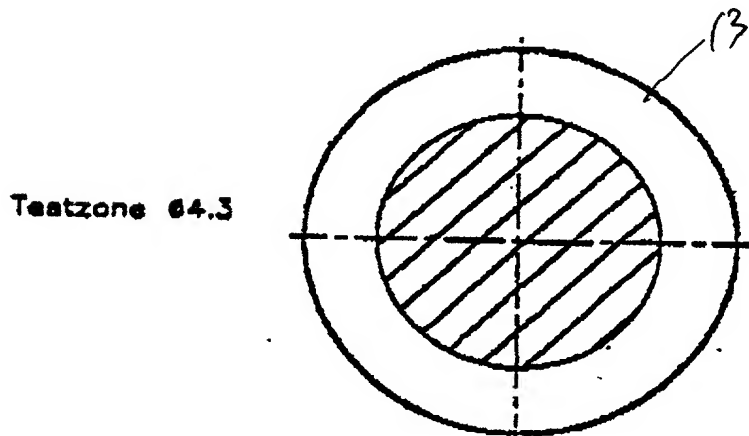


FIG. 1G14

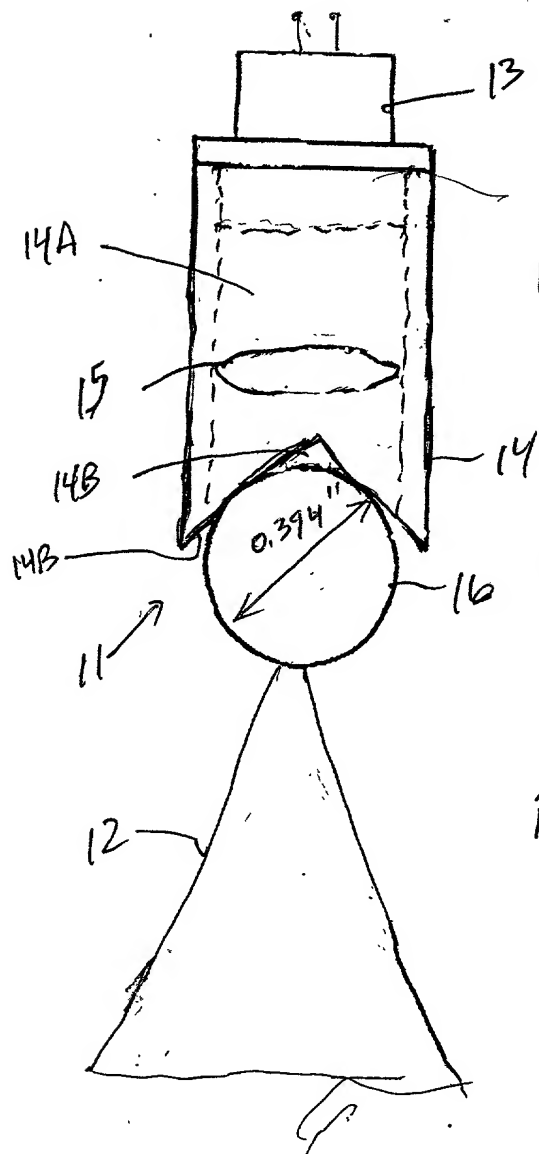


FIG. 1G15A

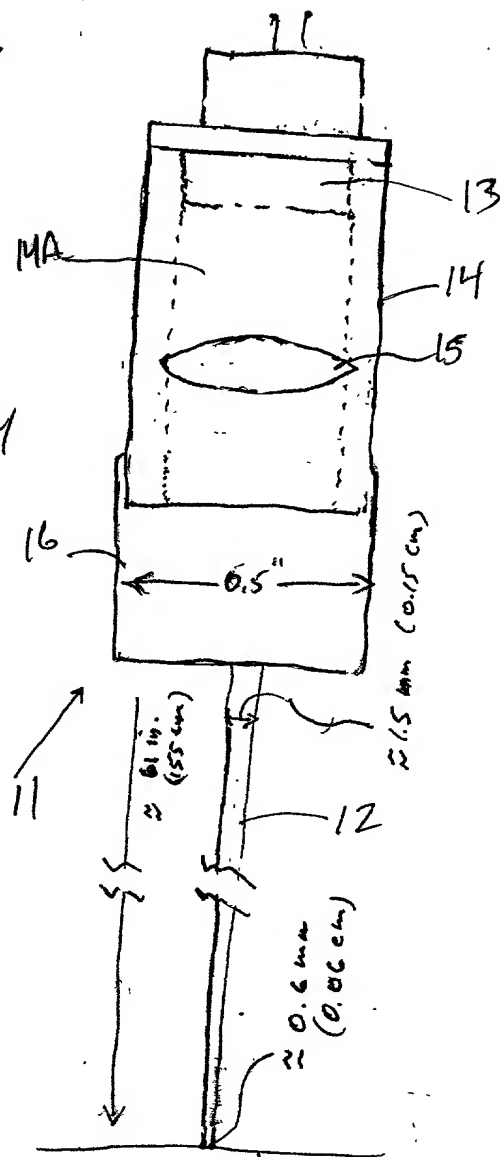


FIG. 1G15B  
furthest  
object/working  
distance

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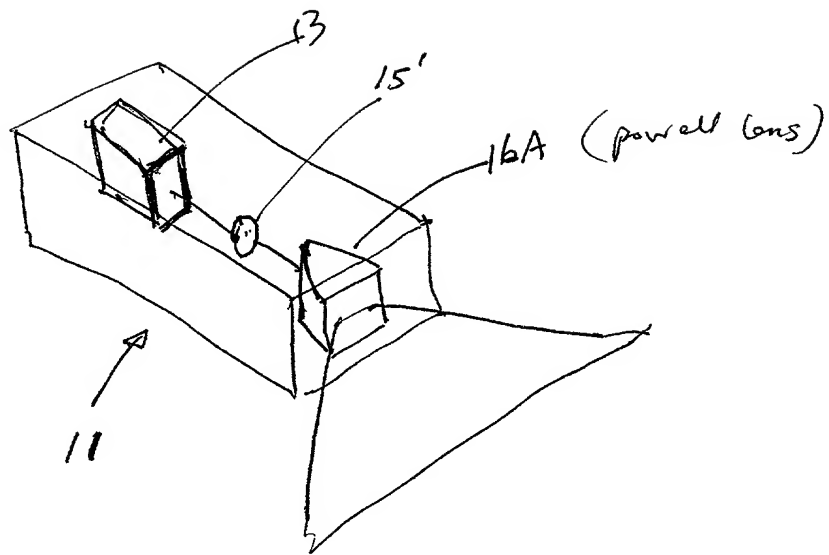


FIG. 1G.16A

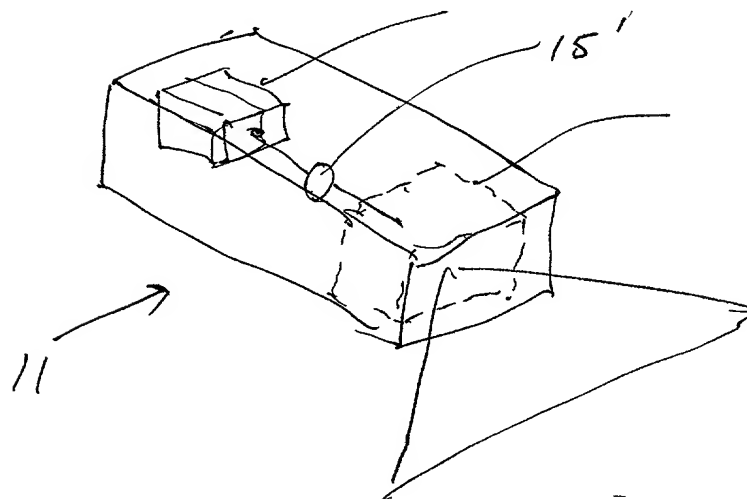


FIG. 1G.16B

PLIM w/  
powell lens

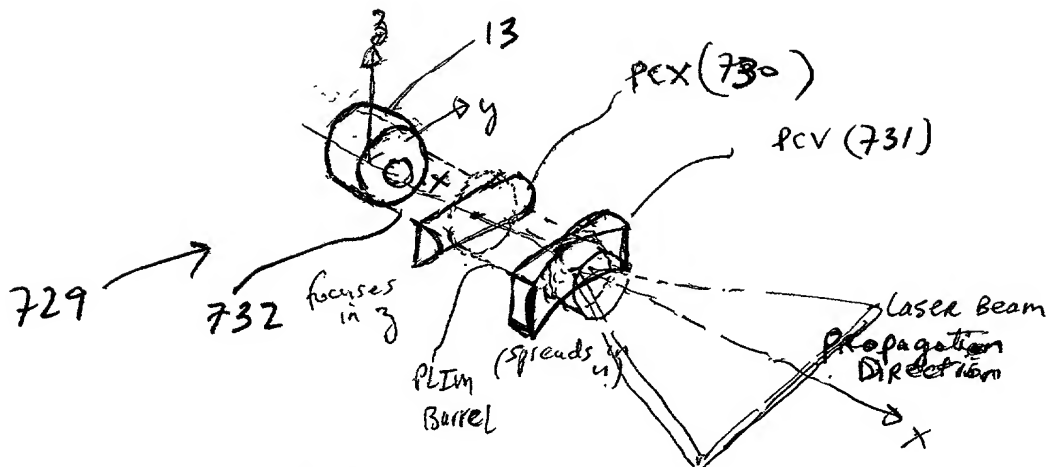


FIG. 16.17A

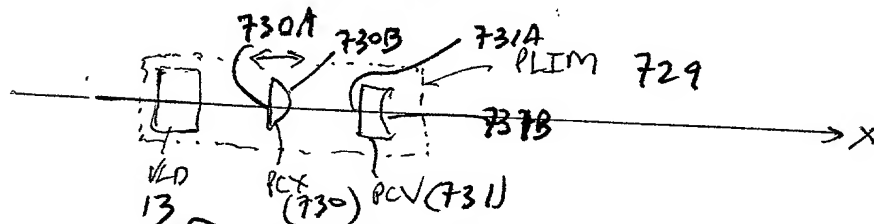


FIG. 16.17B

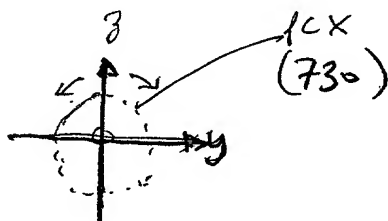


FIG. 16.17C

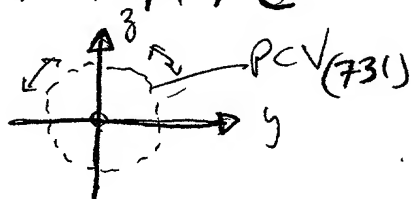


FIG. 16.17D

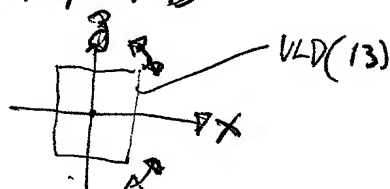


FIG. 16.17E

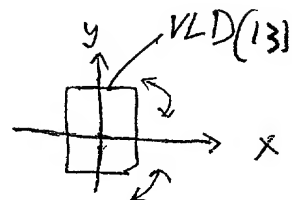
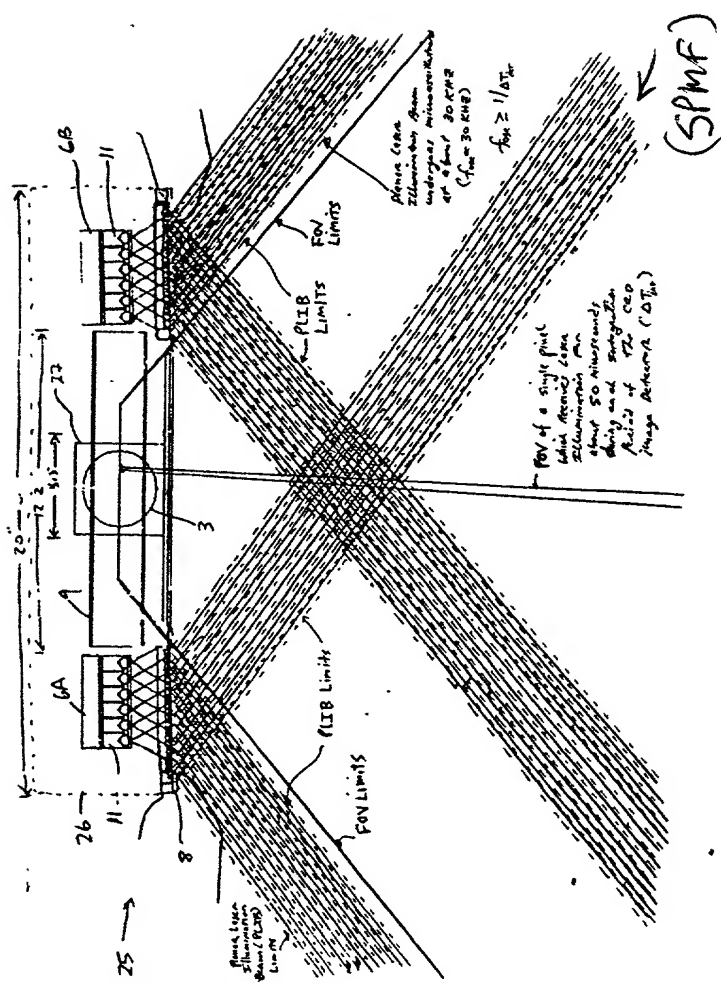


FIG. 16.17F









Prior to object illumination

FIG. 112A

**The First Generalized Speckle-Noise Pattern Reduction Method**  
**Of The Present Invention**

Prior to illumination of the target with the planar laser illumination beam (PLIB), modulate the spatial phase of the transmitted PLIB along the planar extent thereof according to a spatial phase modulation function (SPMF) so as to

produce numerous substantially different time-varying speckle-noise patterns at the image detection array of the IFD Subsystem during the photo-integration time period thereof.

Temporally average the numerous substantially different time-varying speckle-noise patterns produced at the image detection array in the IFD Subsystem during the photo-integration time period thereof, so as to thereby reduce the power of the speckle-noise pattern observed at the image detection array.

FIG. 1I2B

204020 047 25001

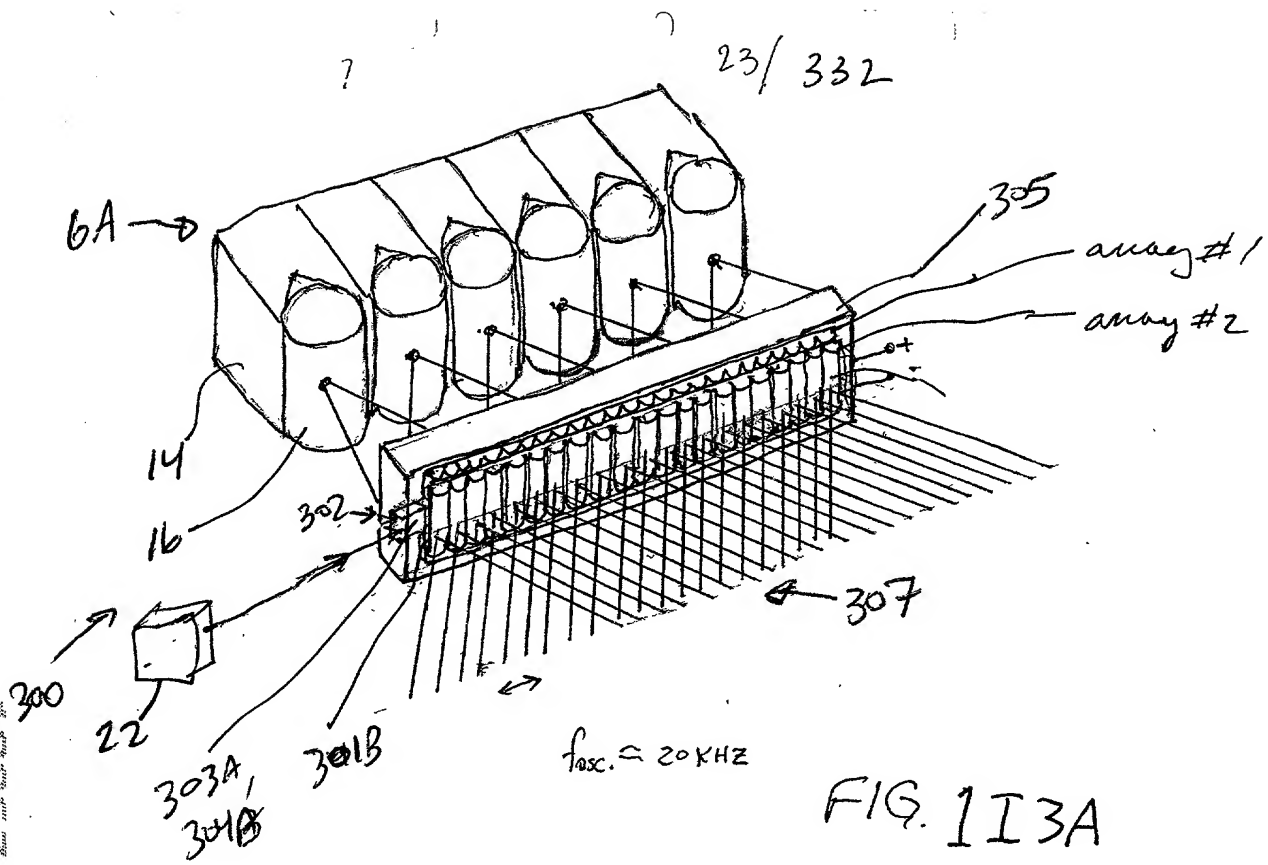


FIG. 1I3A

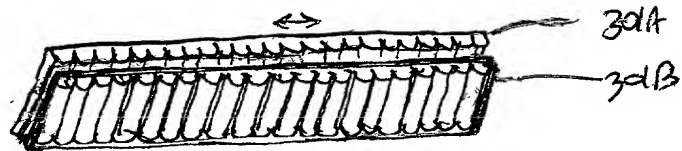


FIG. 1I3B

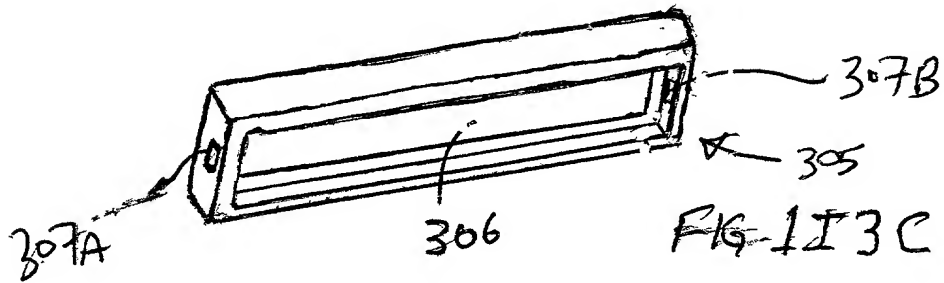


FIG. 1I3C

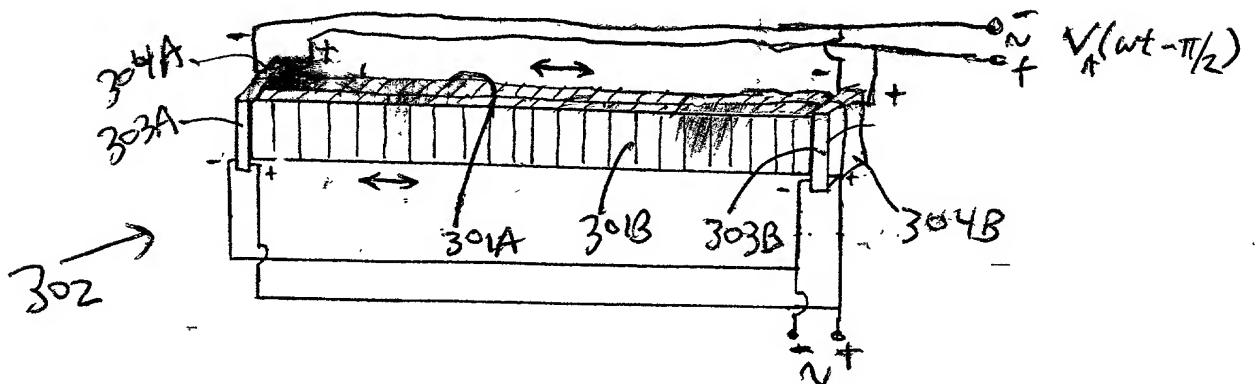


FIG. 1I3D

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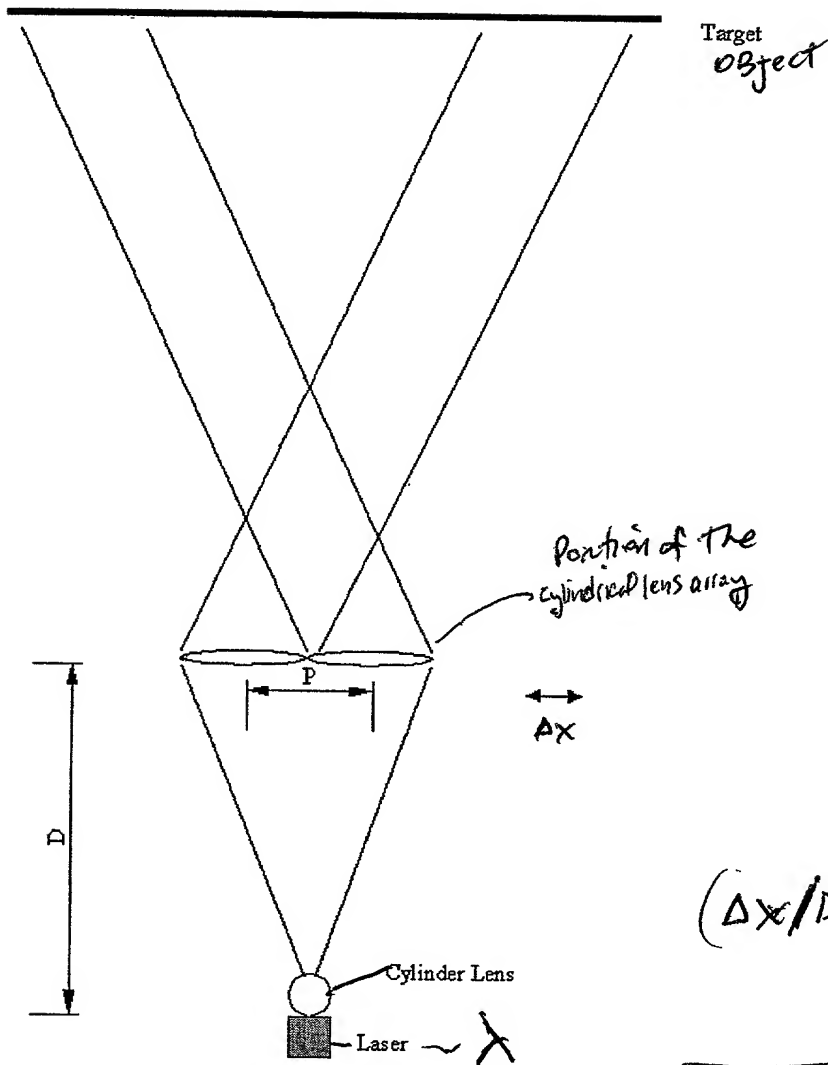


Figure 1

$$(\Delta x / D) P = \lambda$$

$$\Delta x \geq \frac{\lambda \cdot D}{P}$$

FIG. 1I3E

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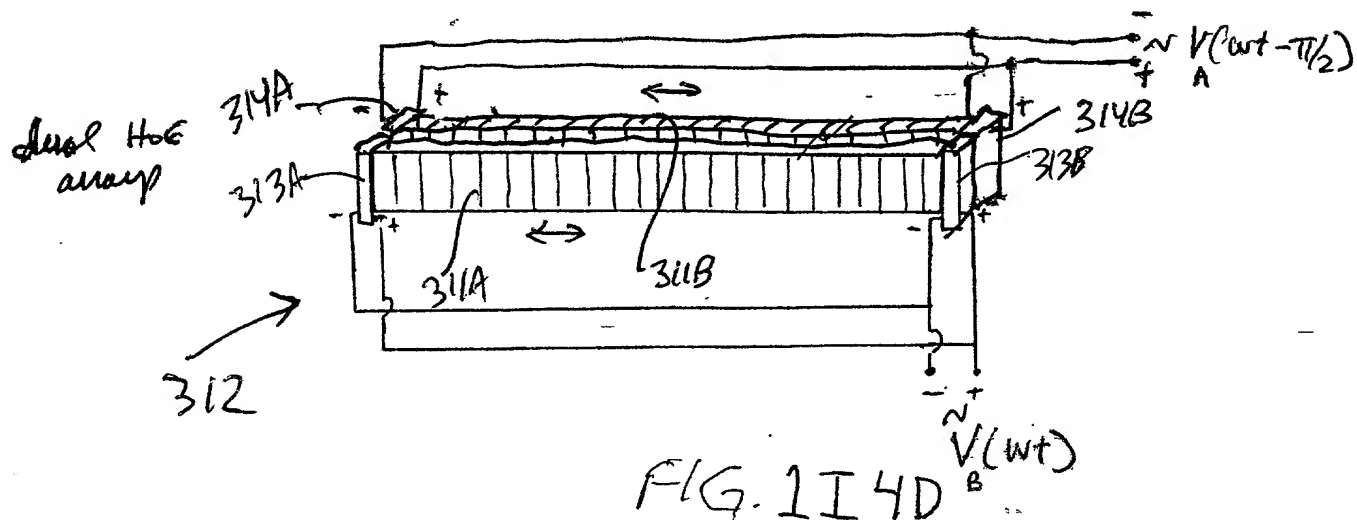
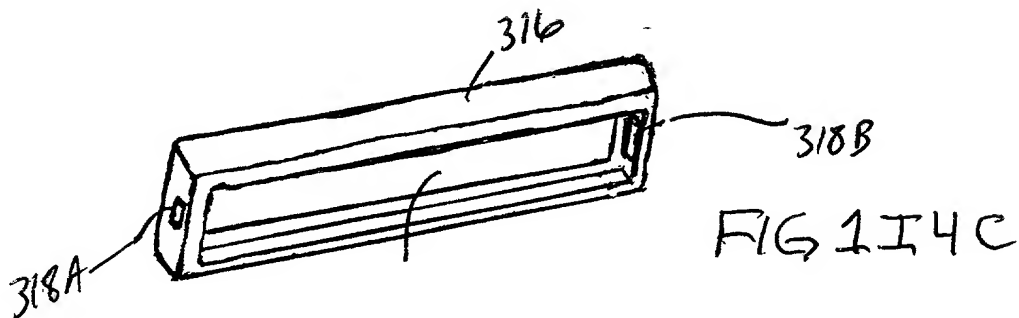
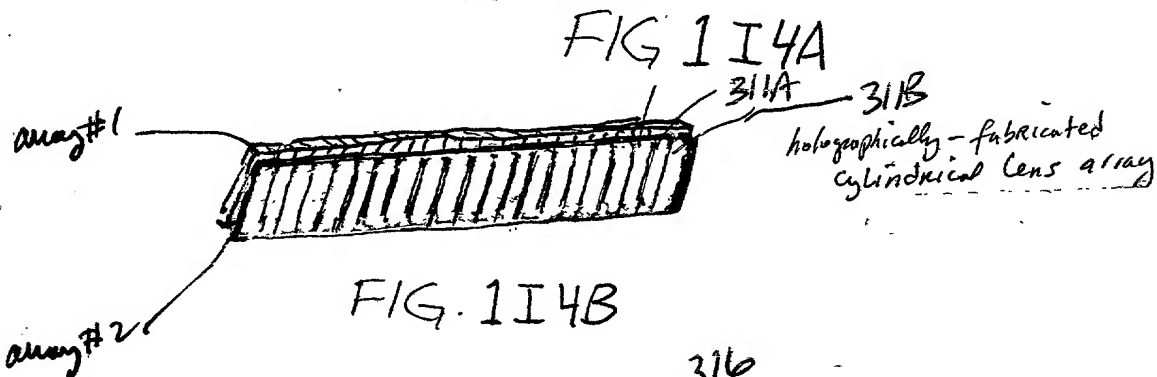
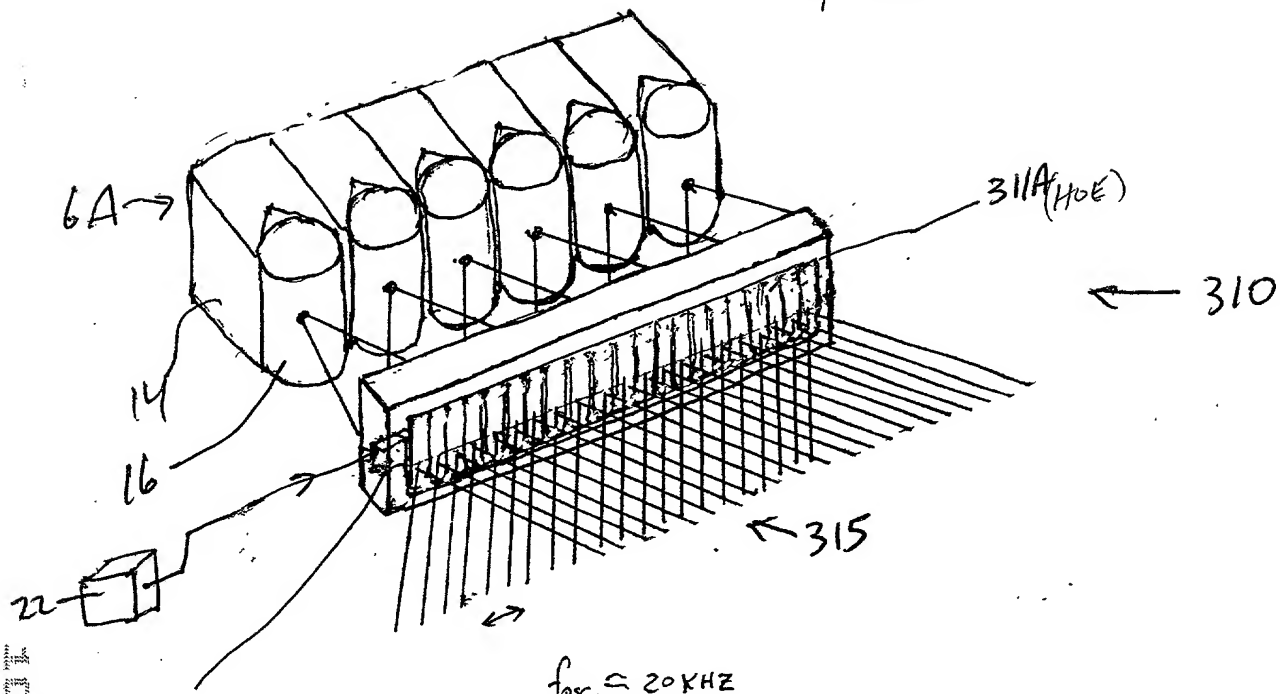


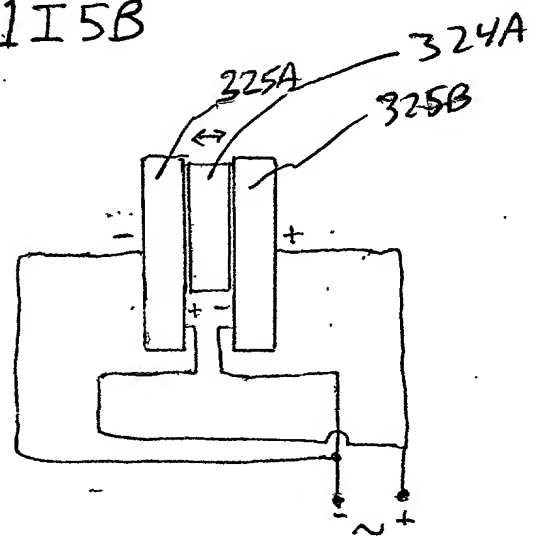
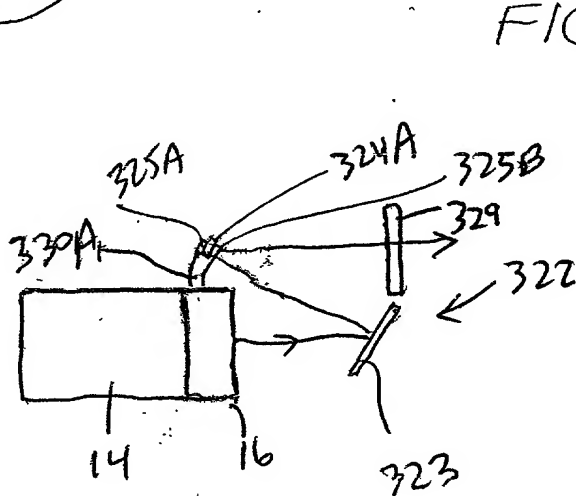
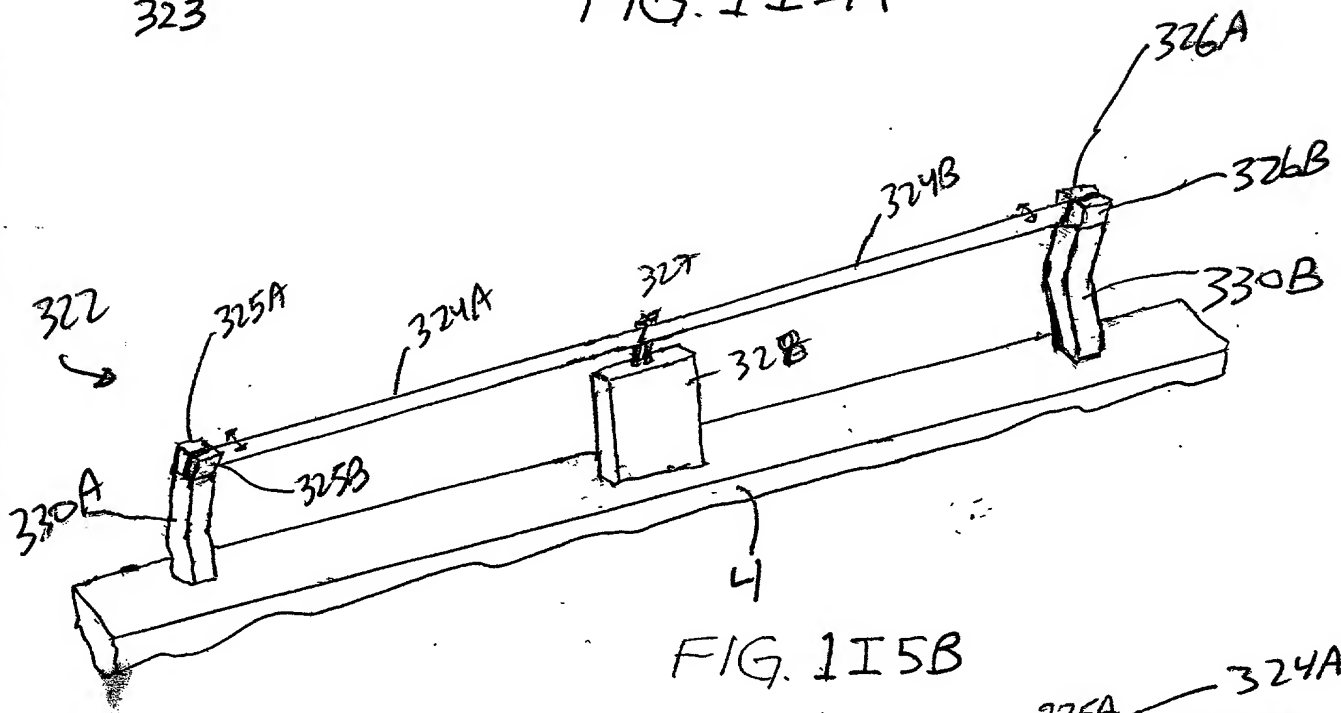
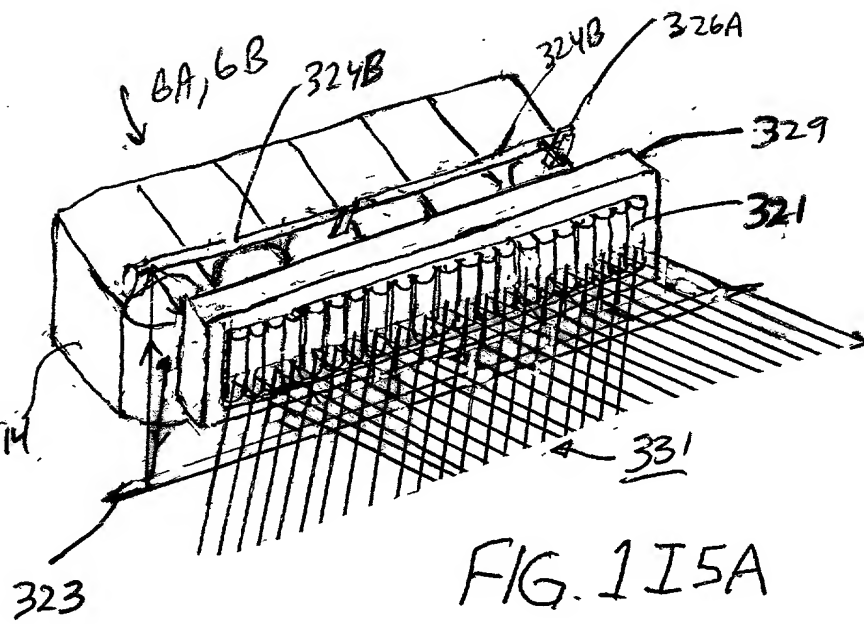
FIG. 1I3F

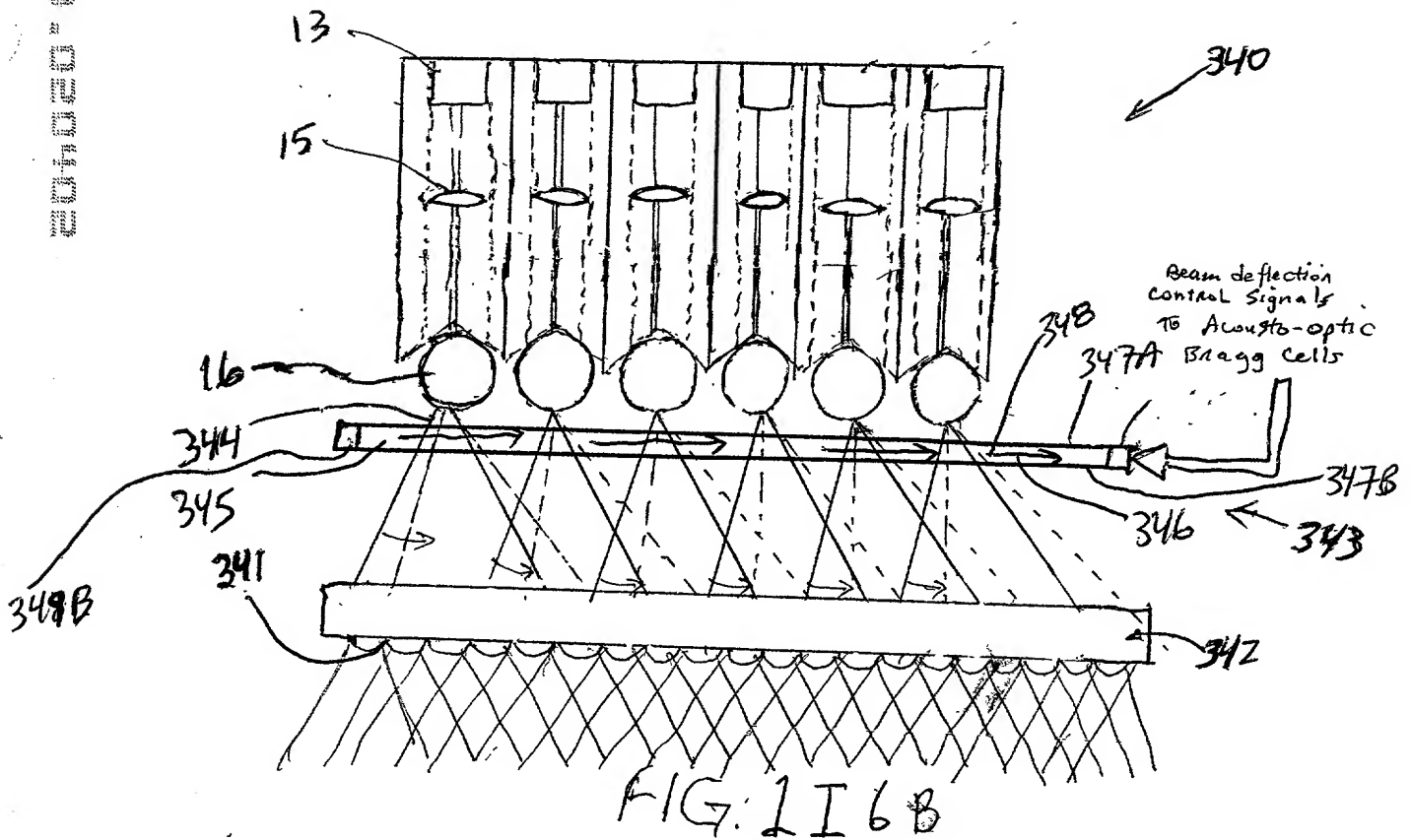
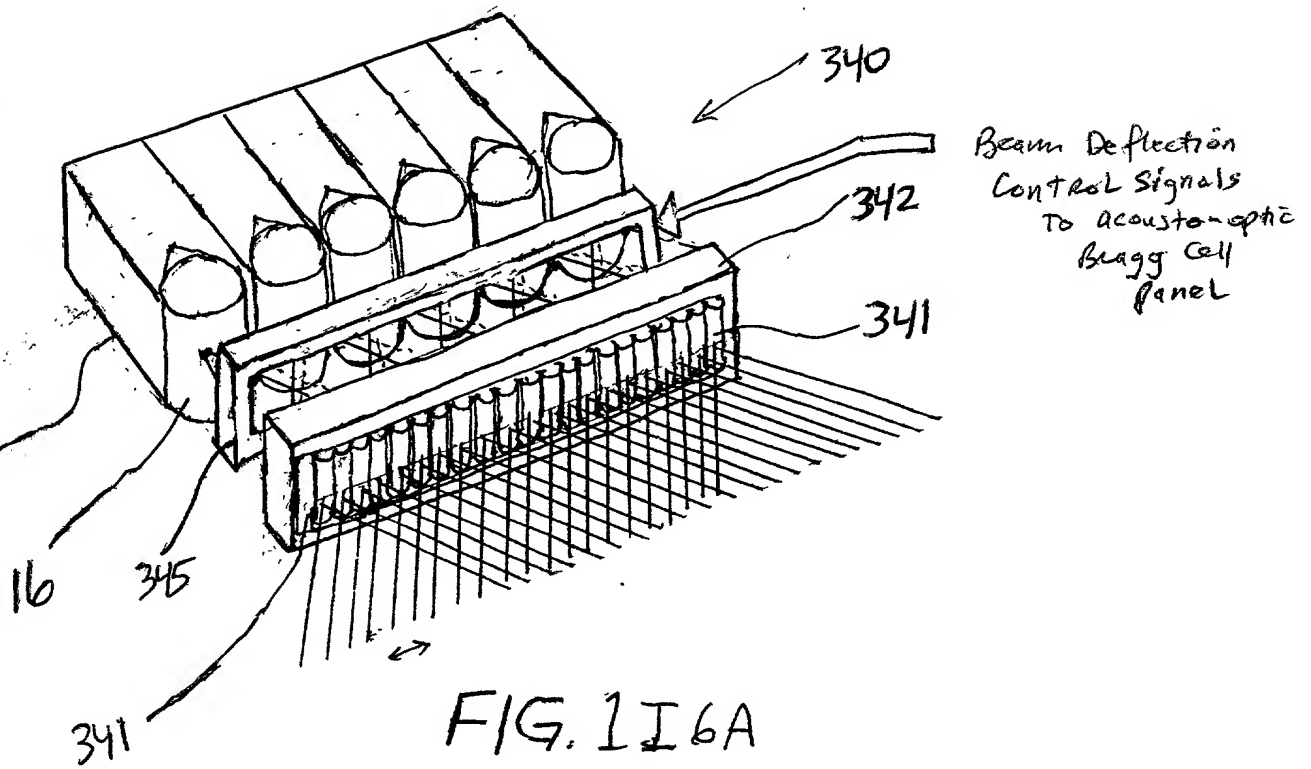


FIG 1I3G

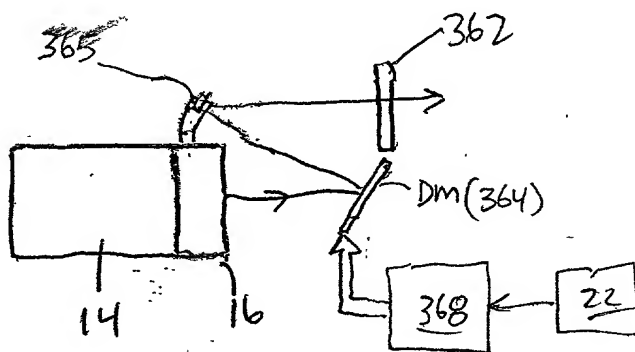
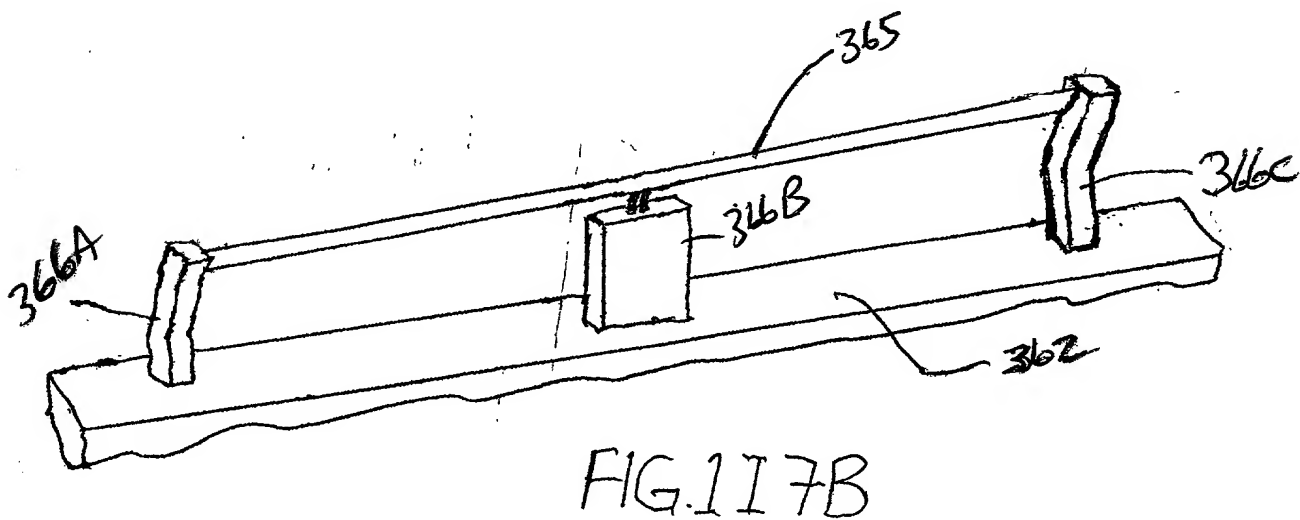
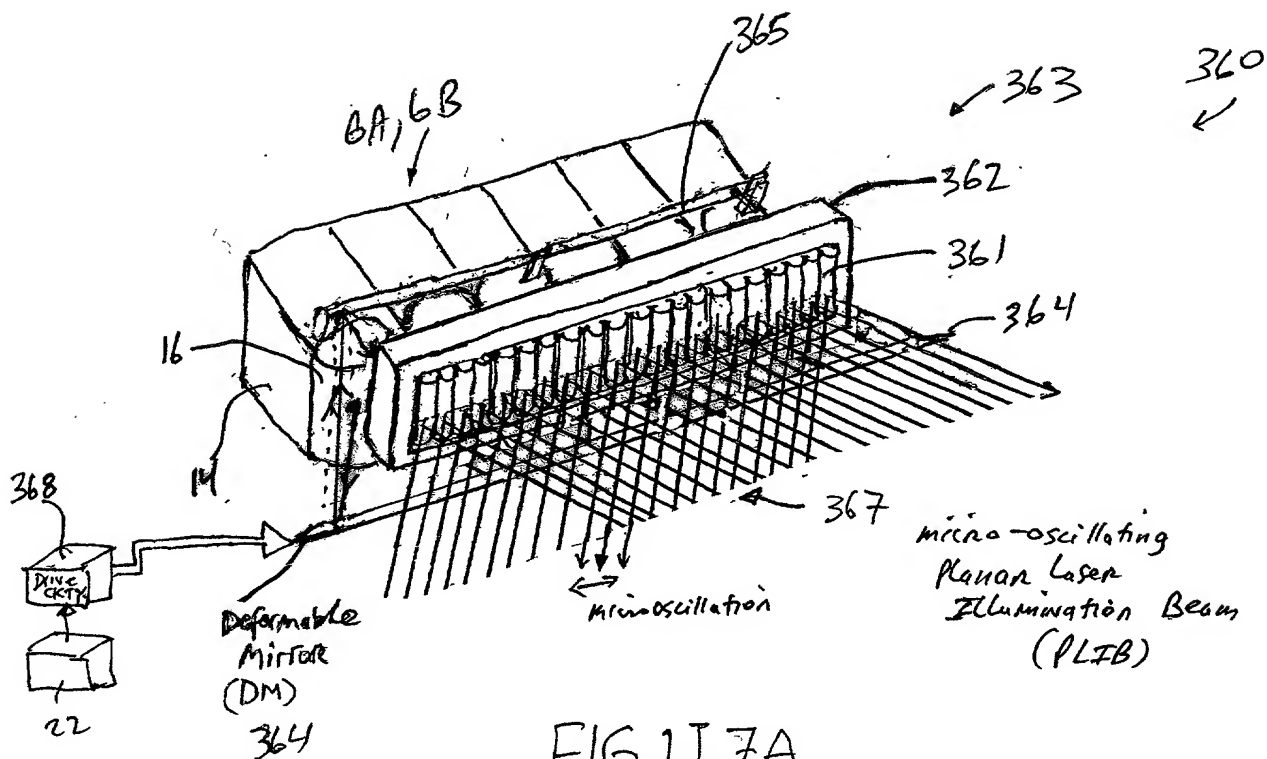
2010-01-01 10:00











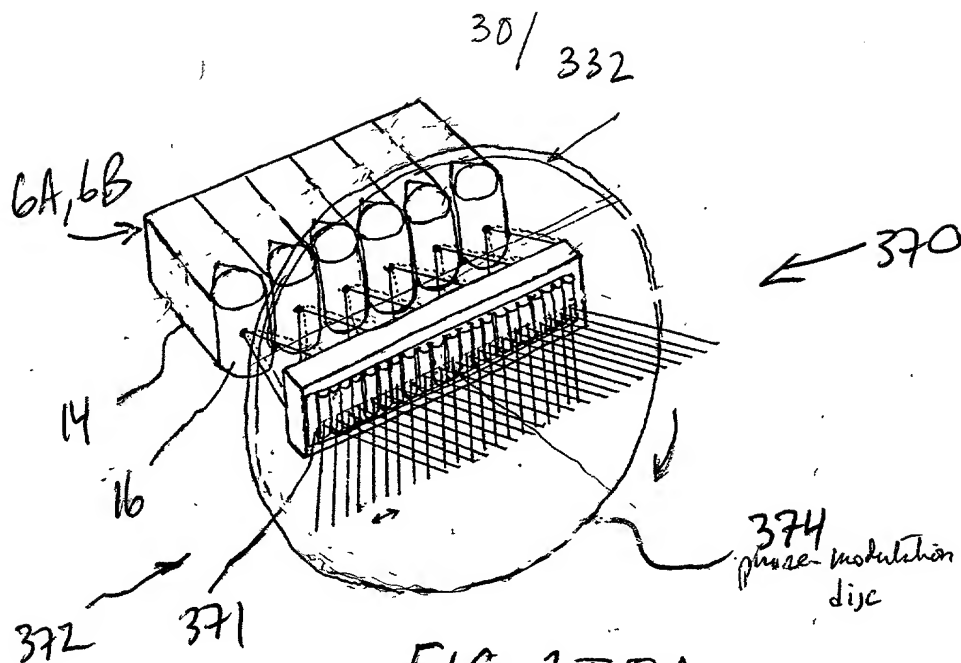


FIG. 1I8A

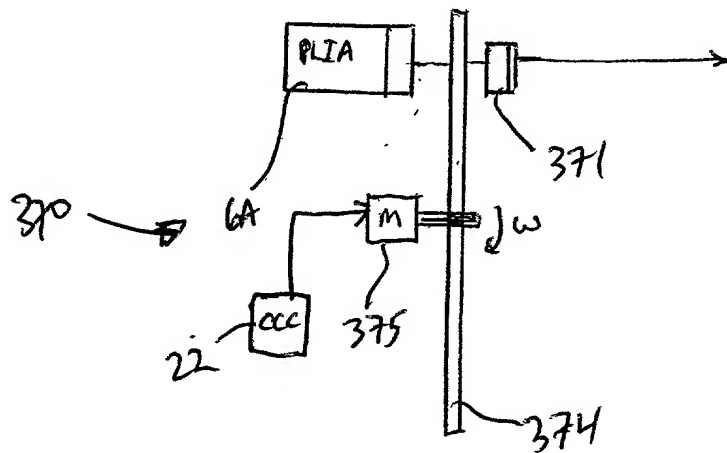


FIG. 1I8B

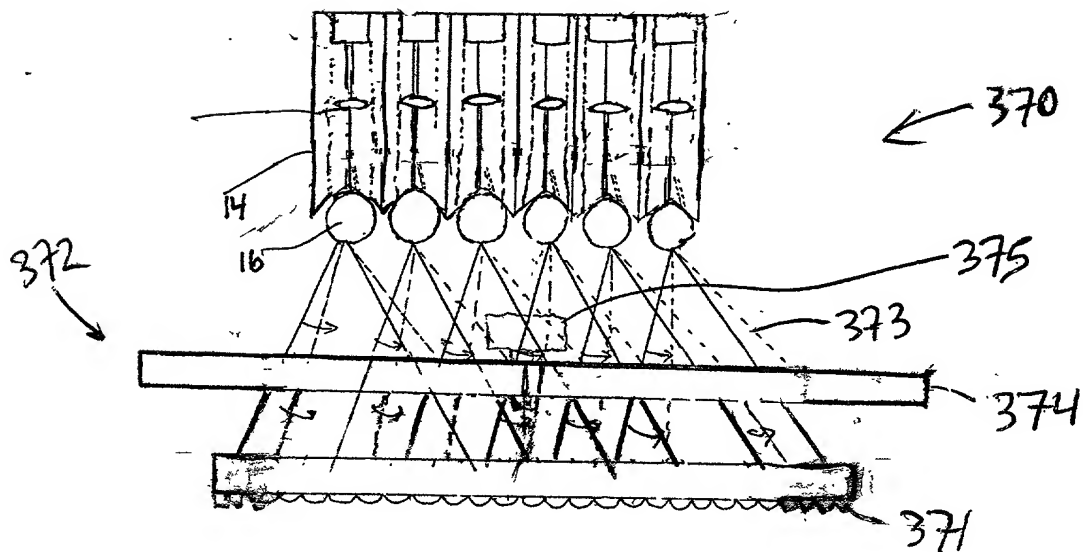


FIG. 1I8C

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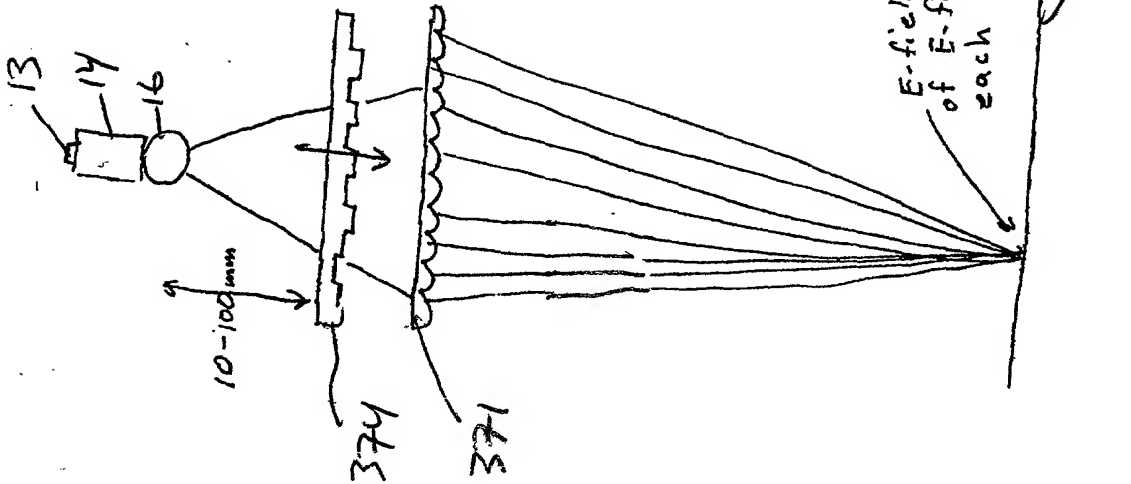


FIG 1I8E

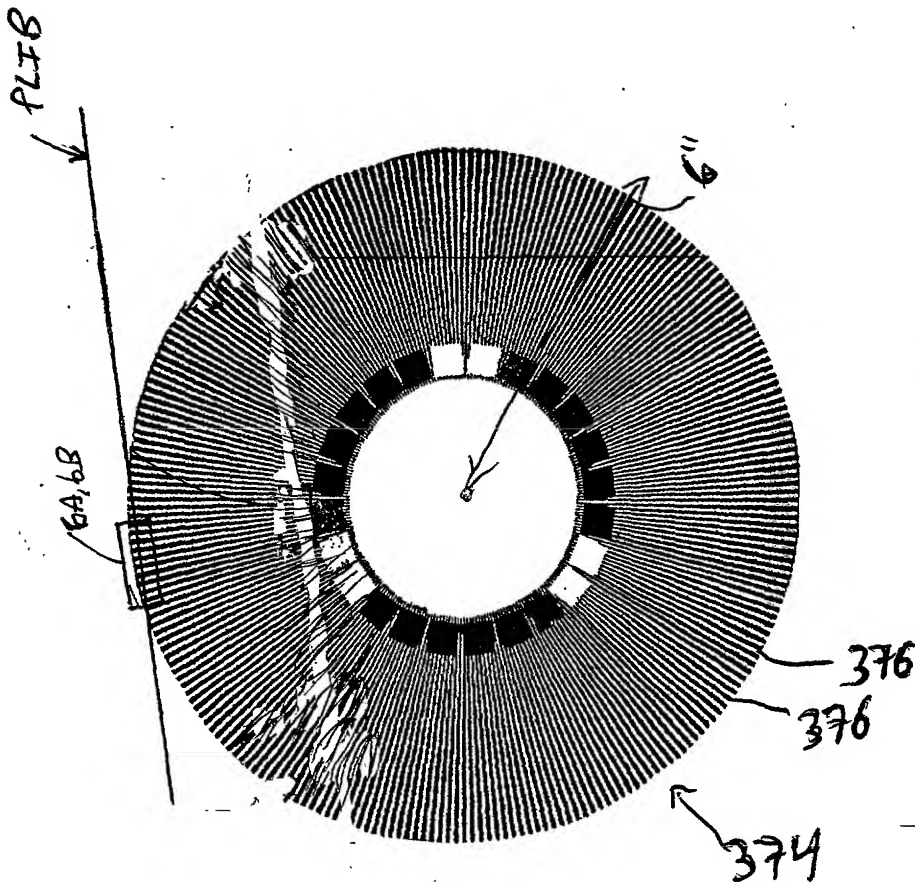
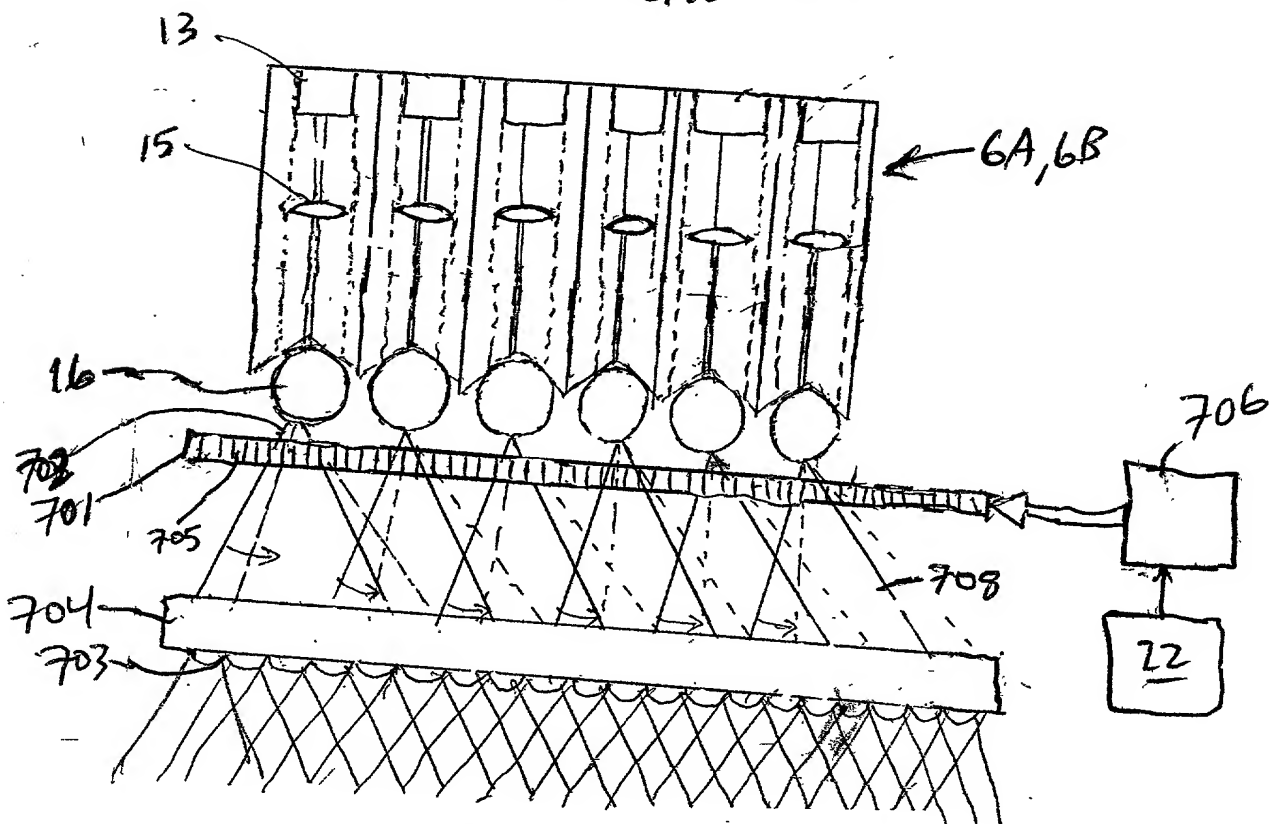
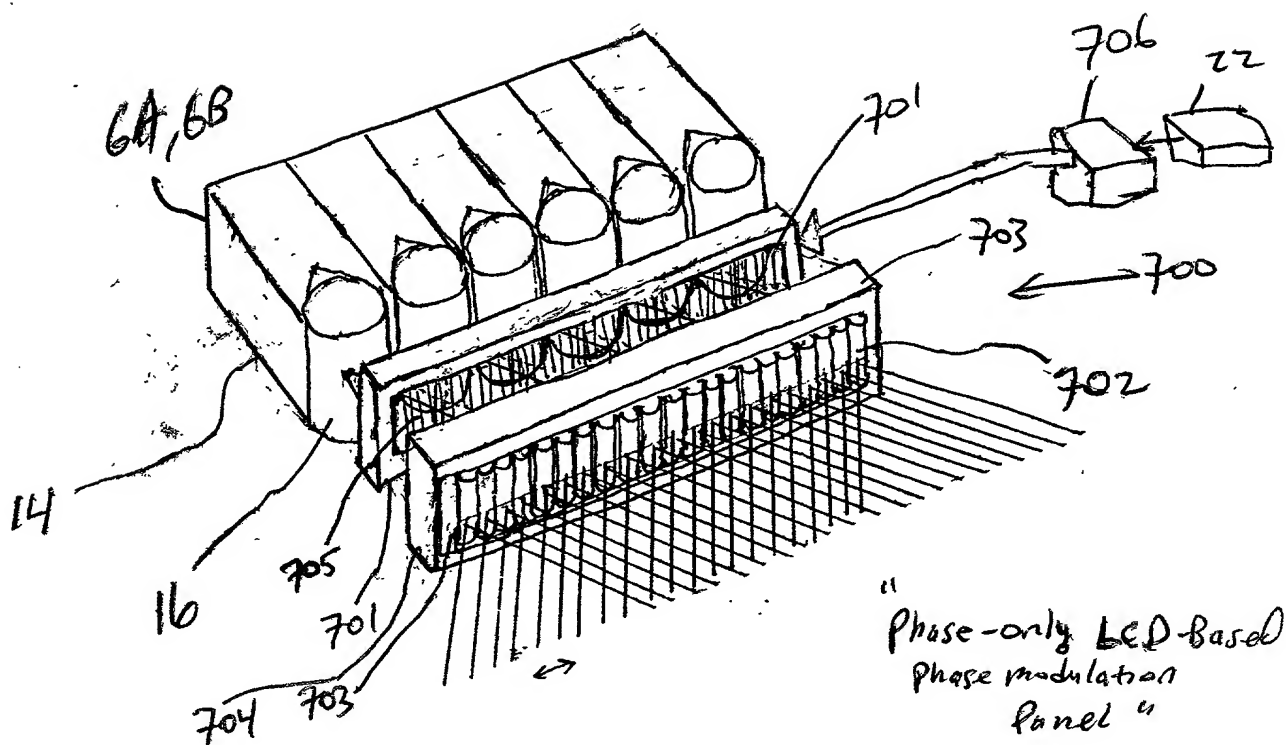


FIG 1I8D



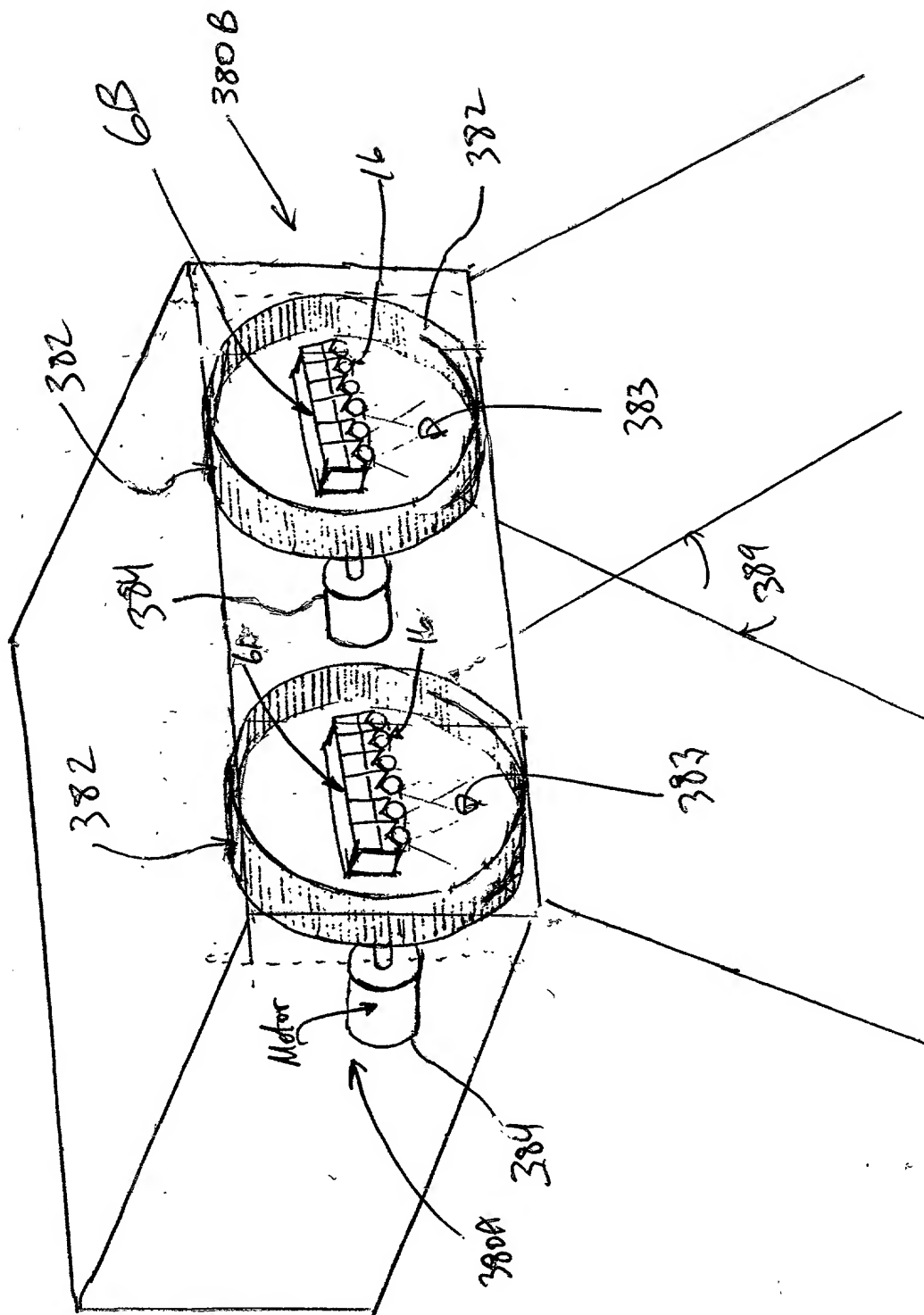


FIG. 1I 9A





Optical Specifications

- 30 cylindrical lens (lines) per linear inch
- focal length : 2.0 millimeters
- diameter of cylindrical carousel  $\approx 4$  inches

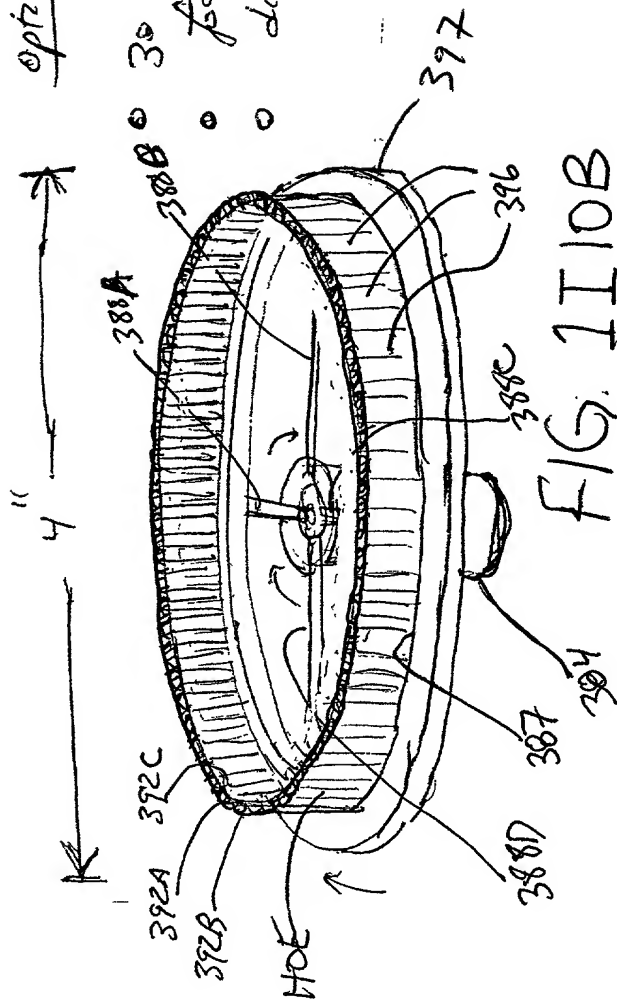
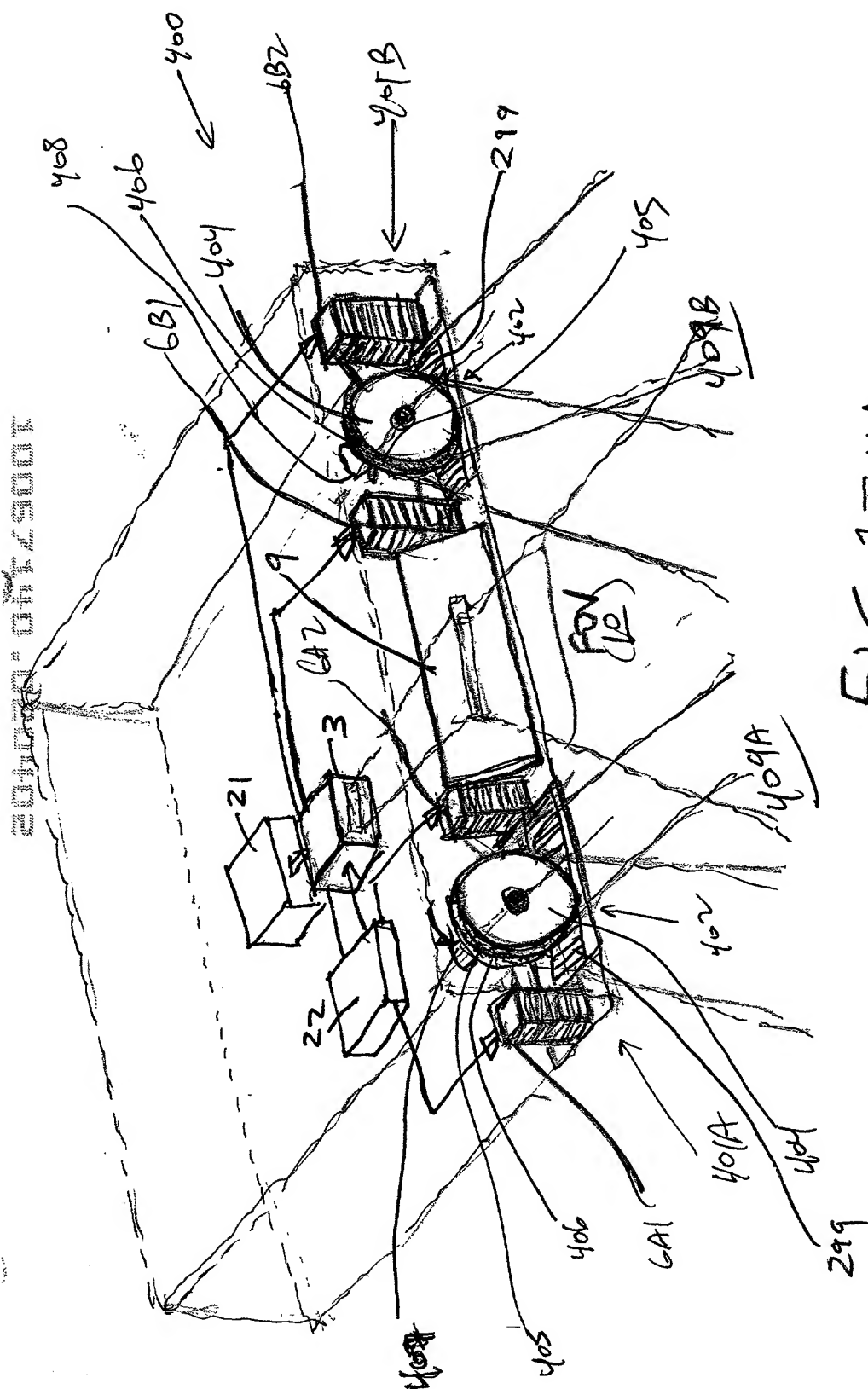


FIG. 1110B





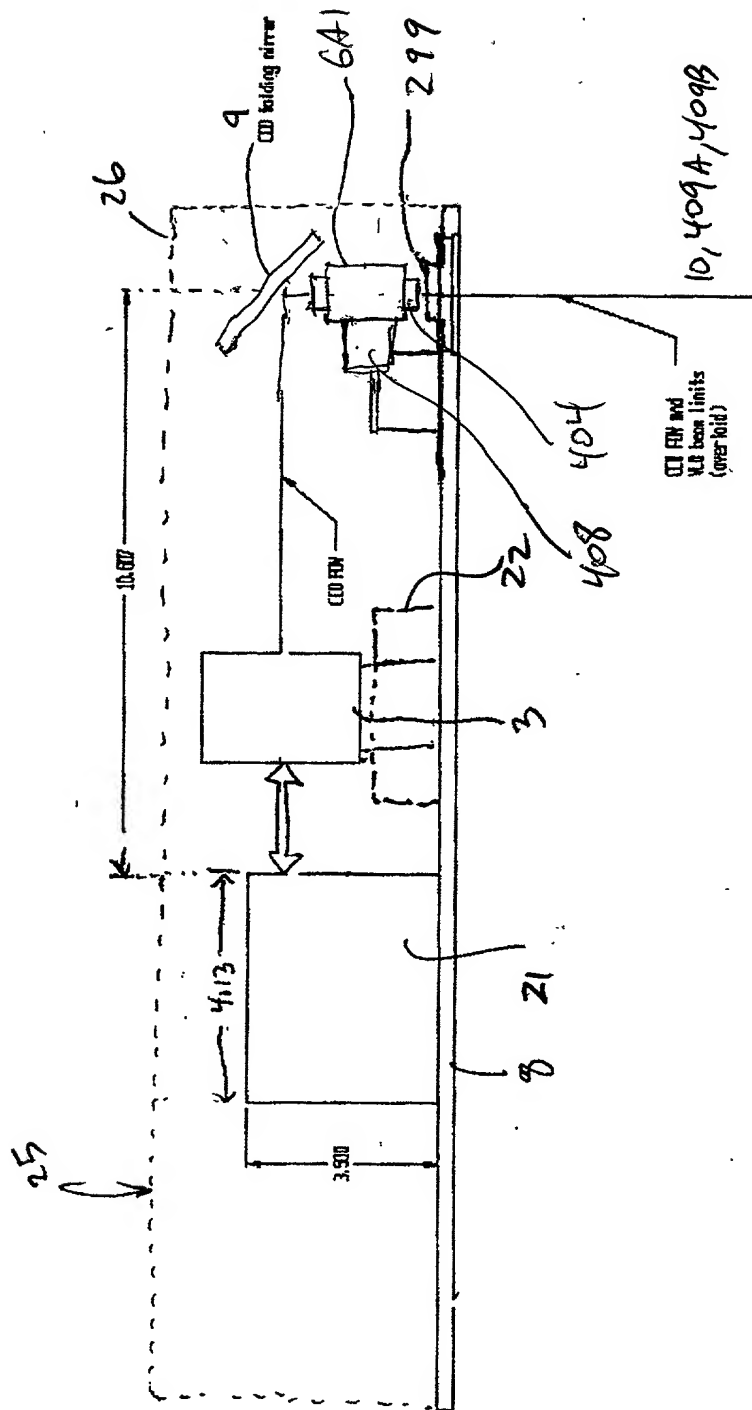


FIG 1I11B



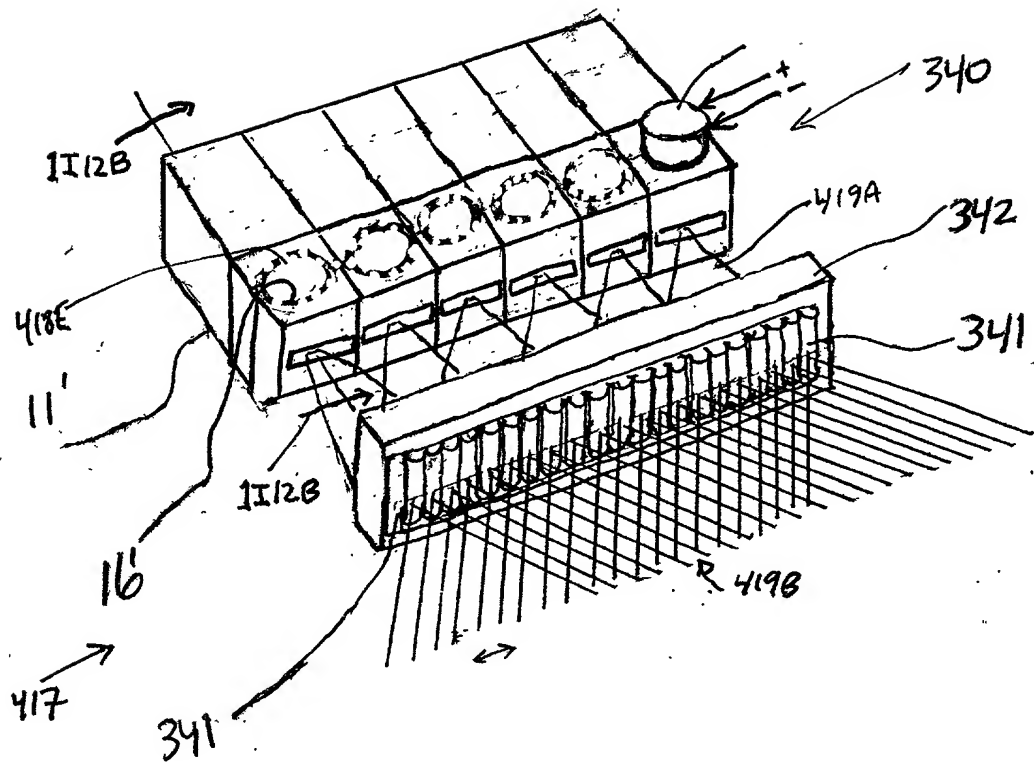


FIG. 1I12A

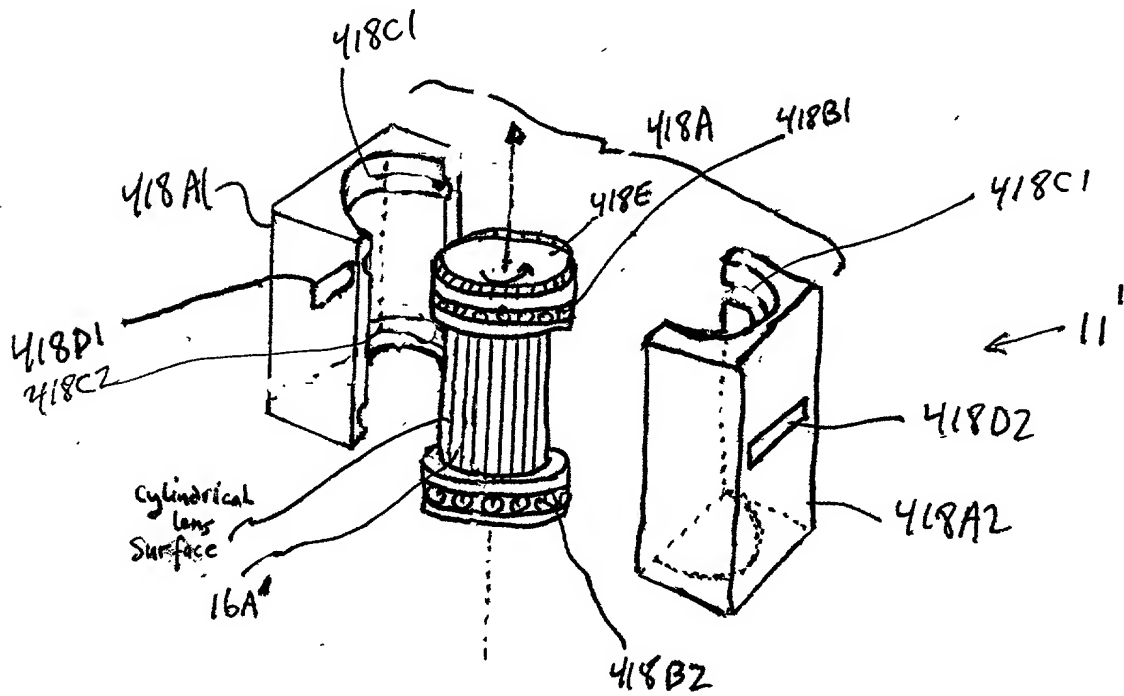


FIG. 1I12B

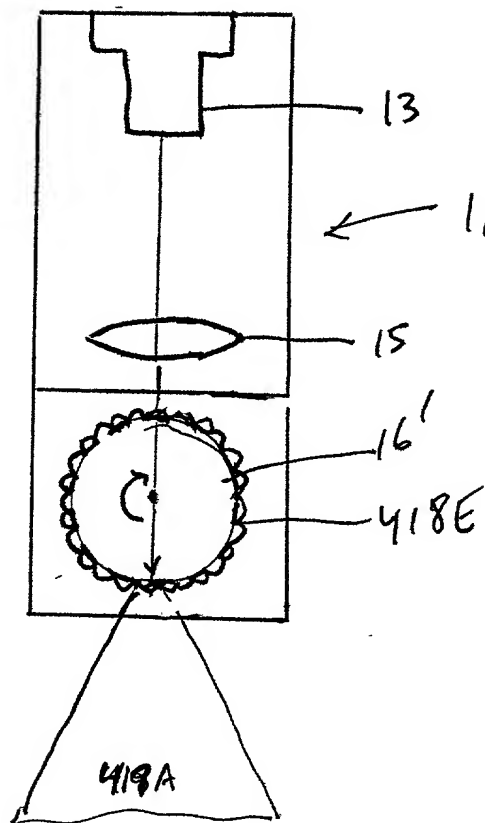


FIG. 1I12C

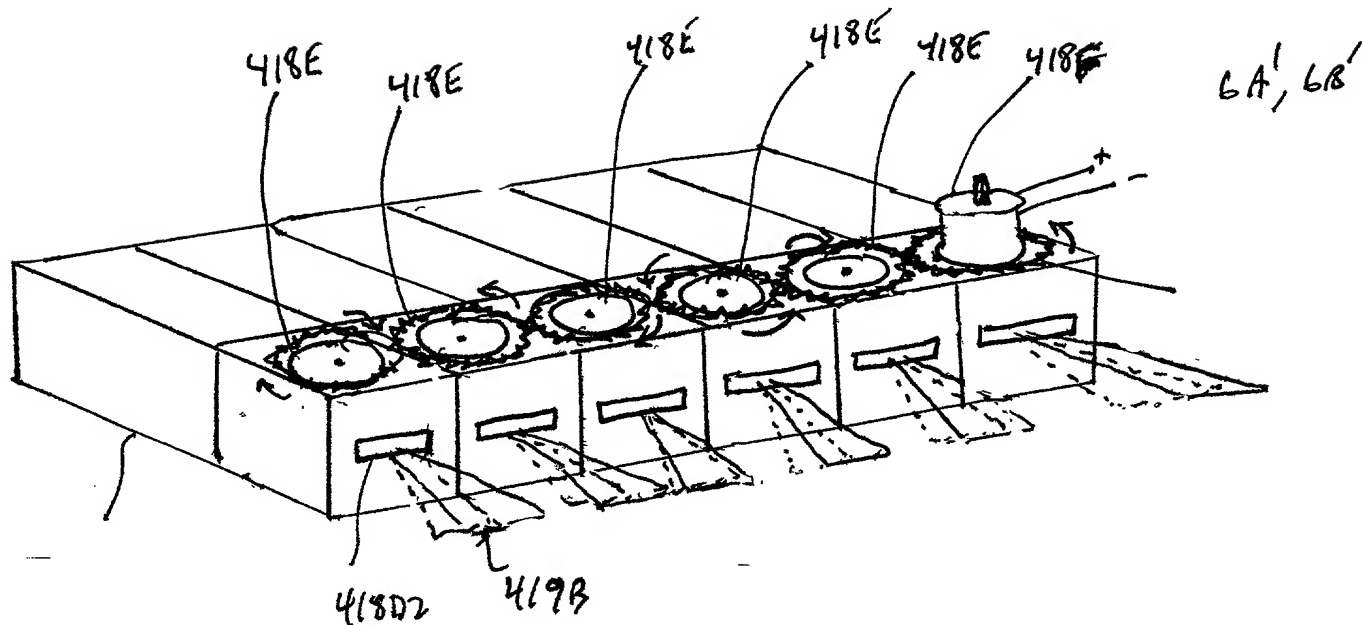


FIG. 1I12D

Second Generalized Method of  
Reducing Speckle-Noise Patterns  
at Image Detection Array  
of the FFD Subsystem (3)

(TIME)

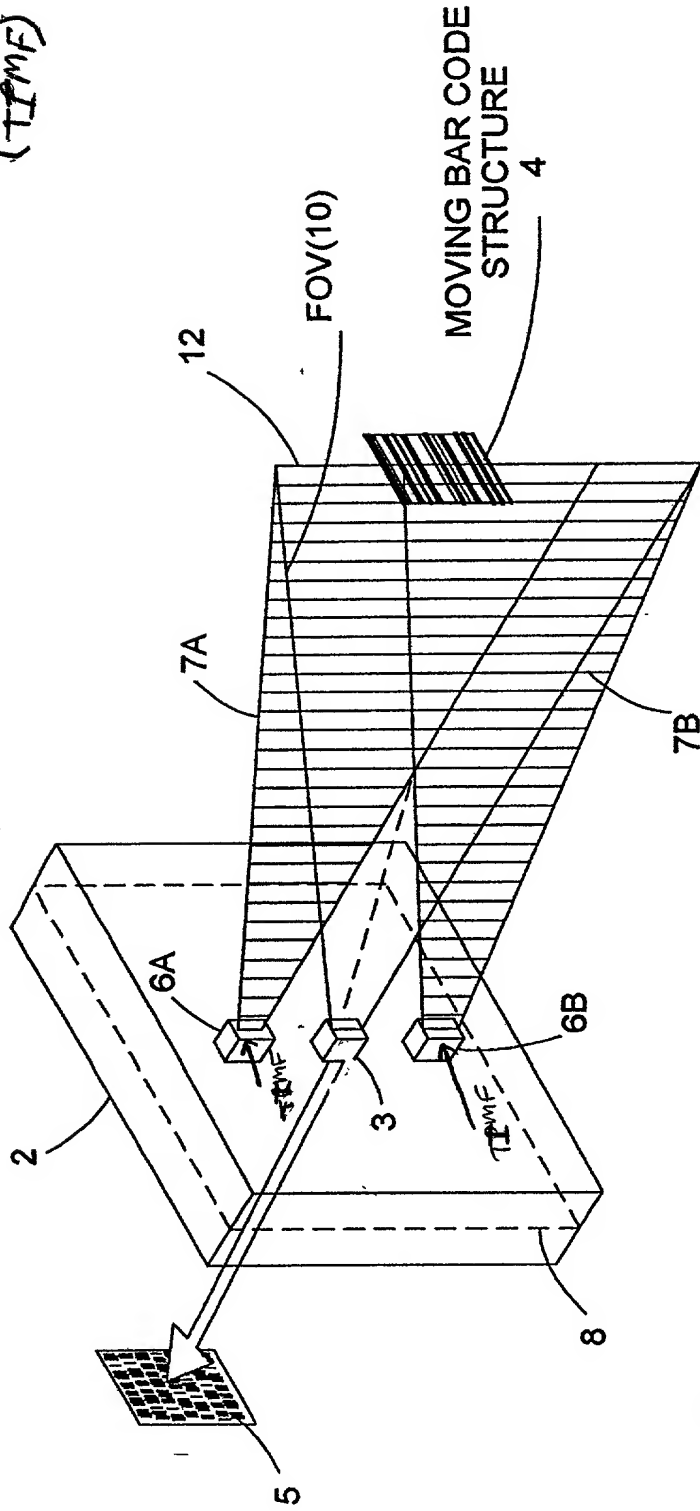


FIG. 1113

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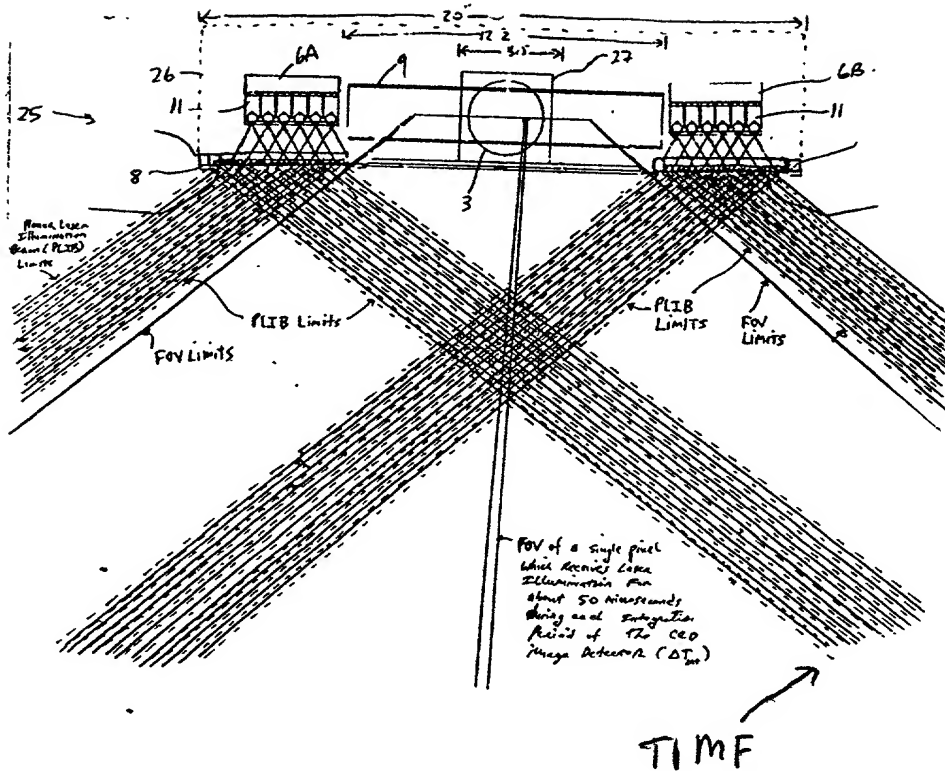


FIG. 1 I 13A

The Second Generalized Speckle-Noise Pattern Reduction Method  
Of The Present Invention

Prior to illumination of the target with the planar laser illumination beam (PLIB), modulate the temporal intensity of the transmitted PLIB along the planar extent thereof according to a temporal intensity modulation function (TIMF) so as to

produce numerous substantially different time-varying speckle-noise patterns at the image detection array of the IFD Subsystem during the photo-integration time period thereof.

Temporally average the numerous substantially different time-varying speckle-noise patterns produced at the image detection array in the IFD Subsystem during the photo-integration time period thereof, so as to thereby reduce power of the speckle-noise pattern observed at the image detection array.

FIG. 1I/3B



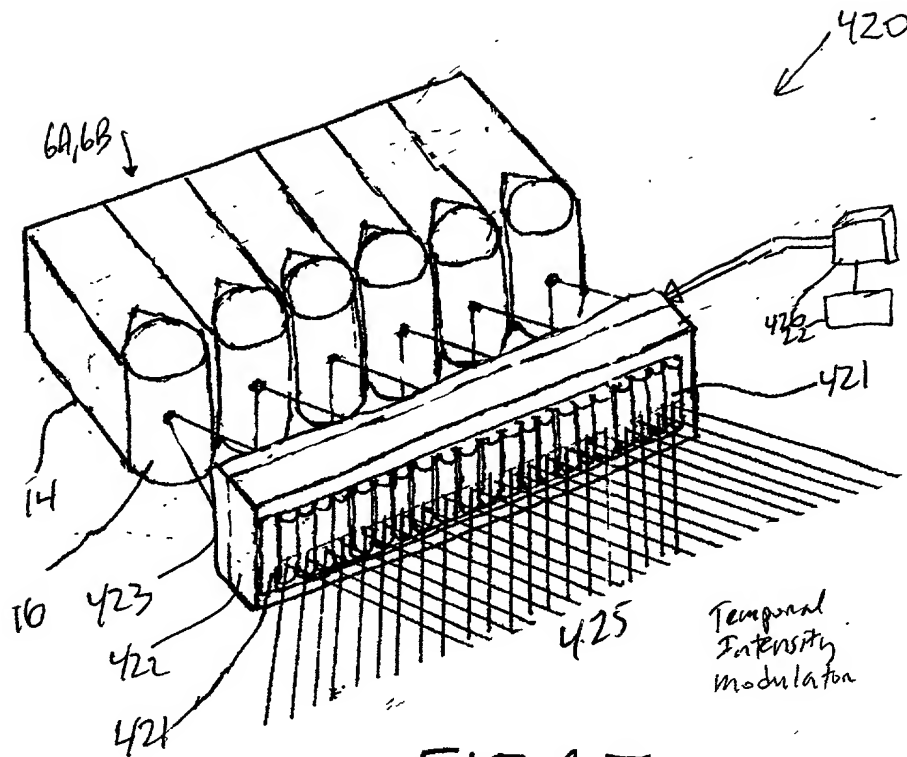


FIG. 1I14A

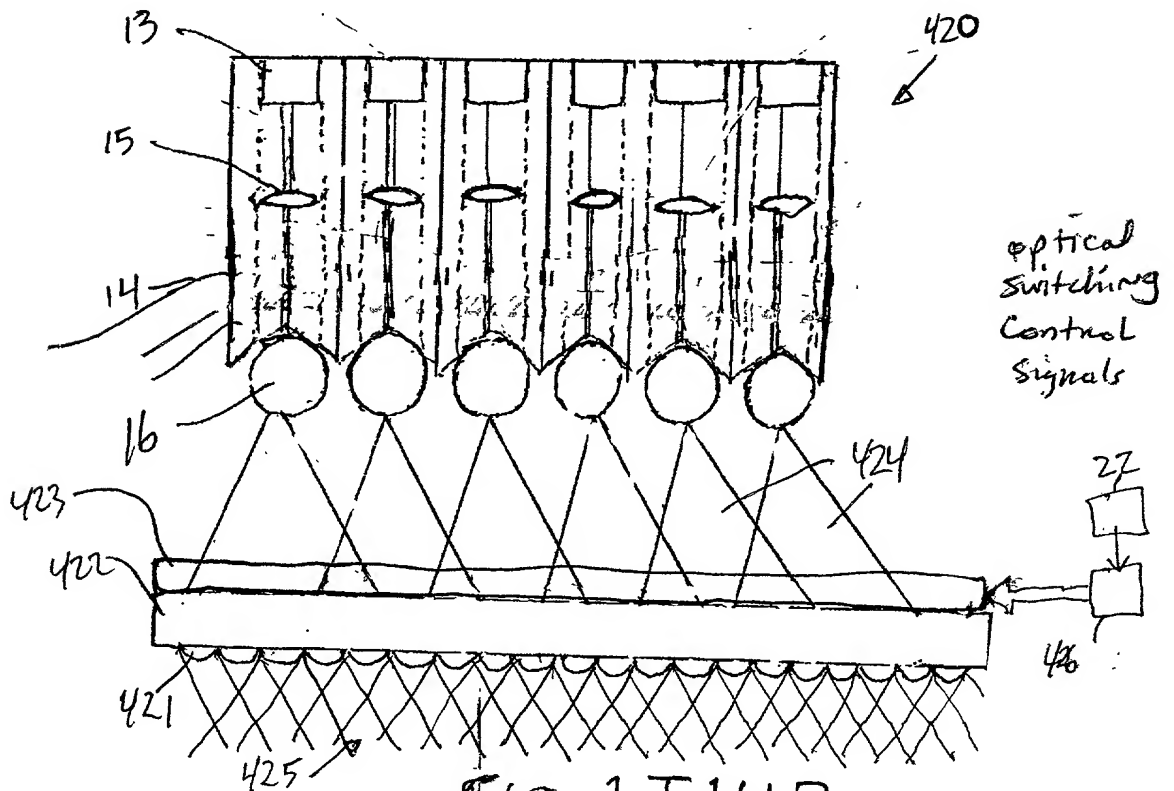


FIG. 1I14B

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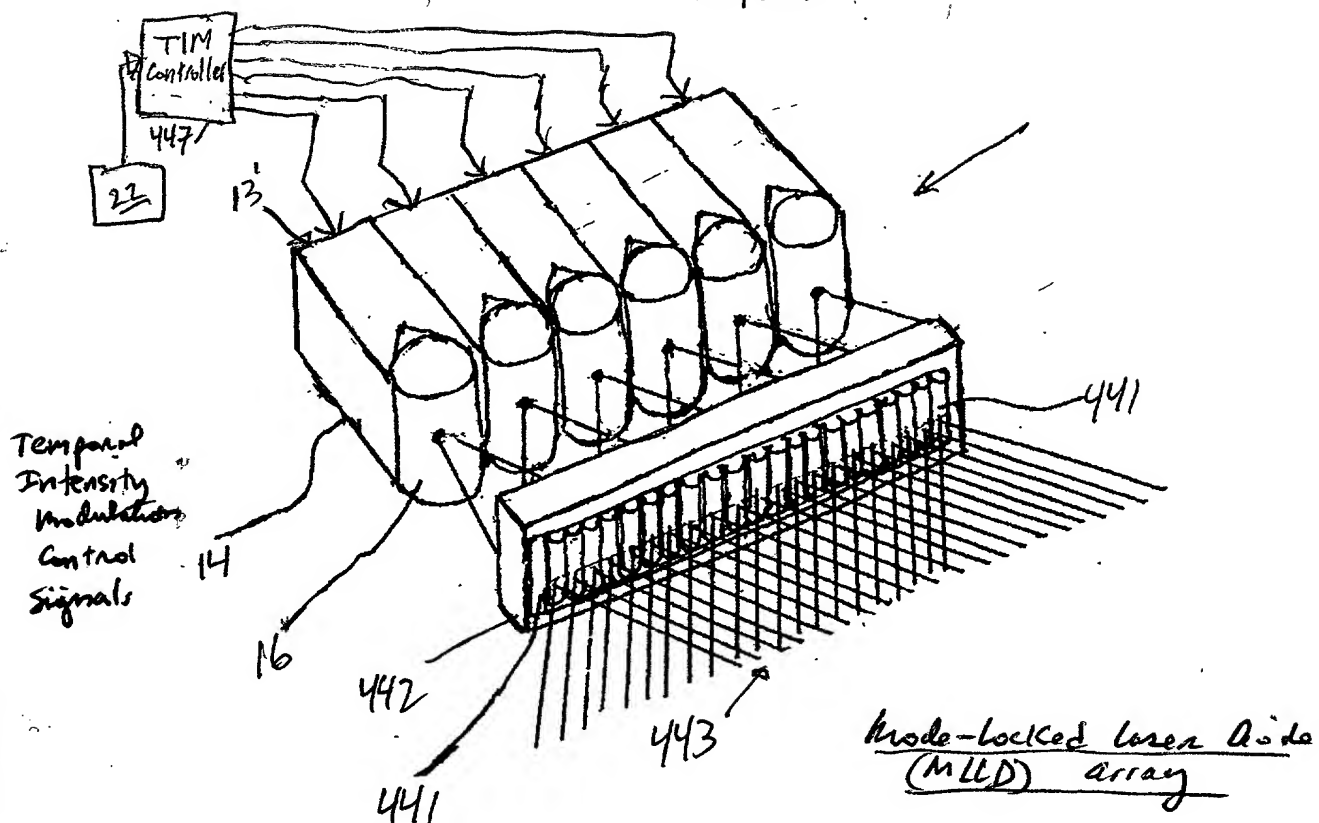


FIG. 1I15A

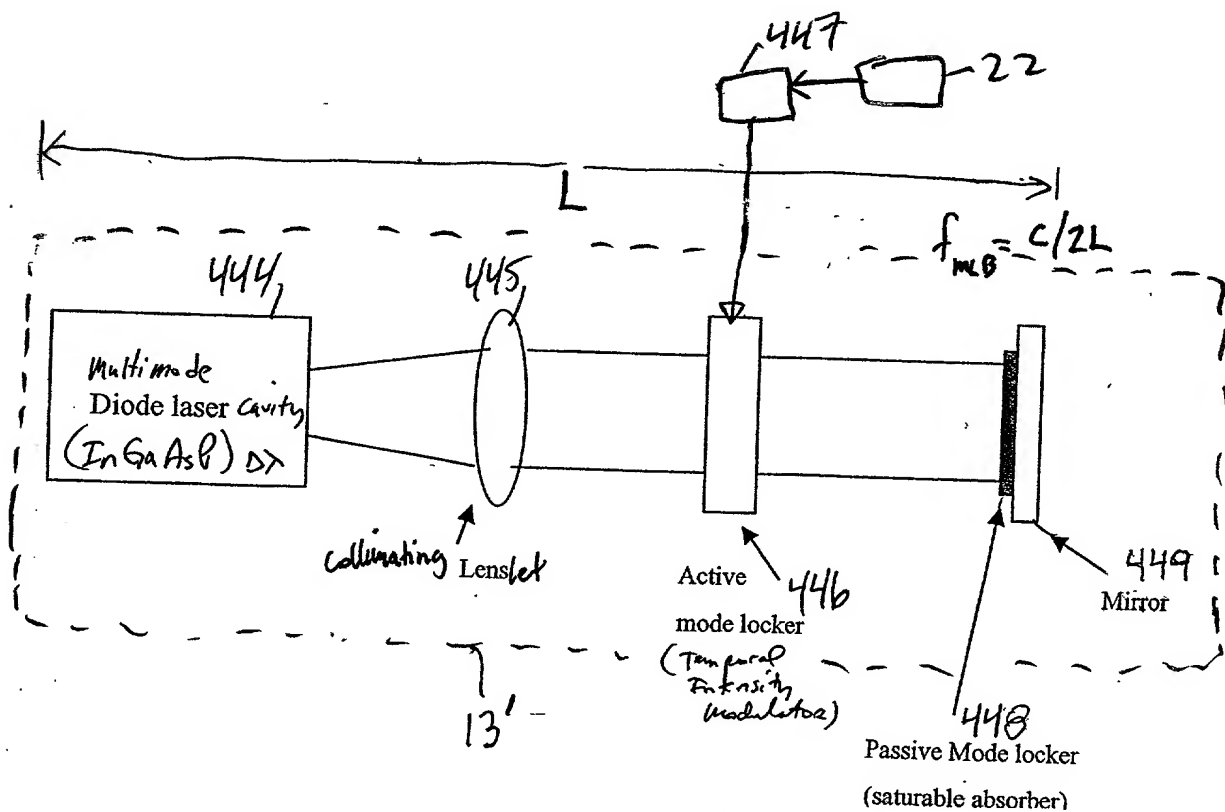
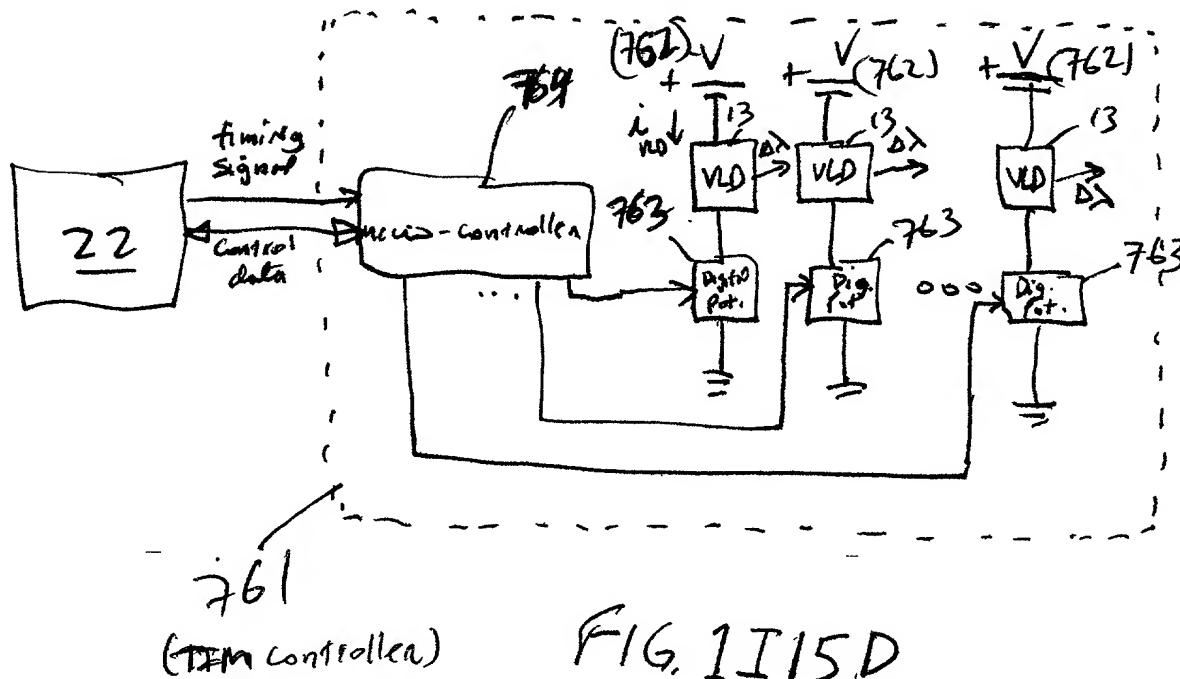
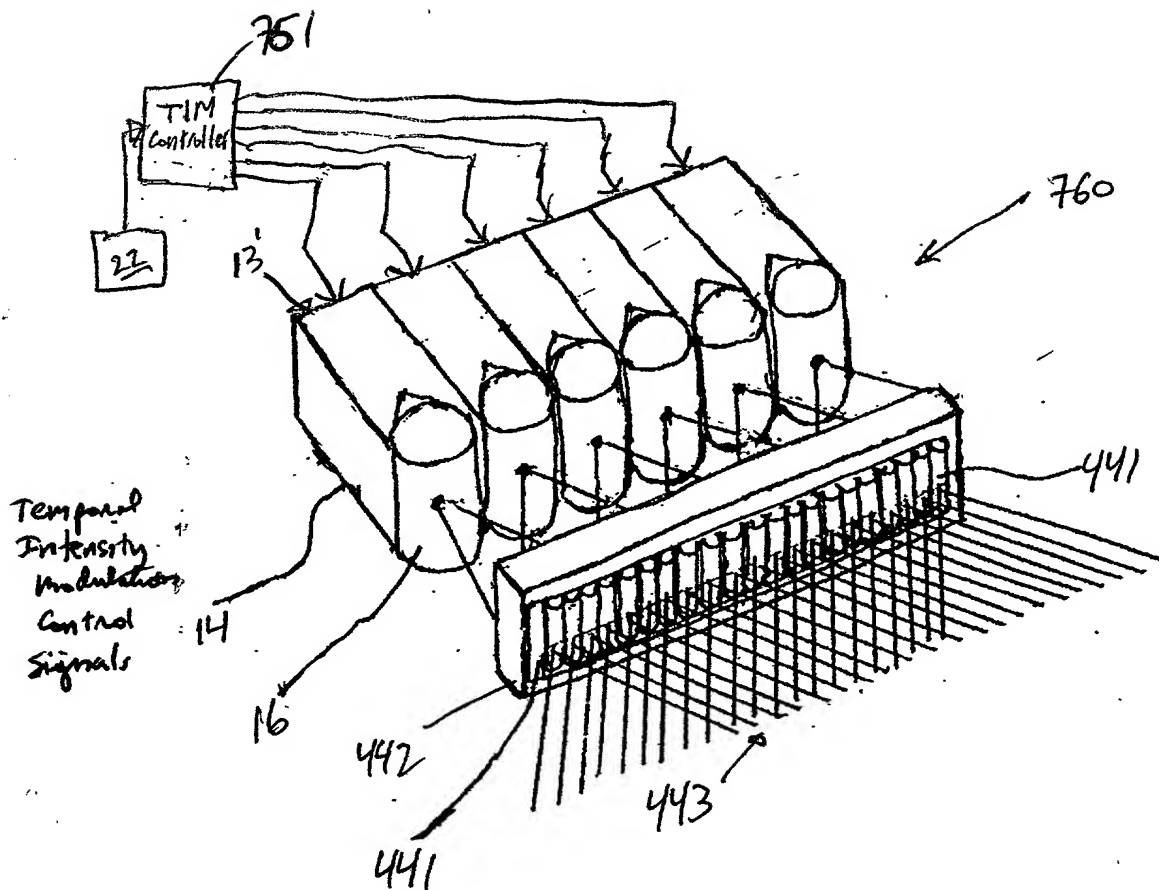


FIG. 1I15B



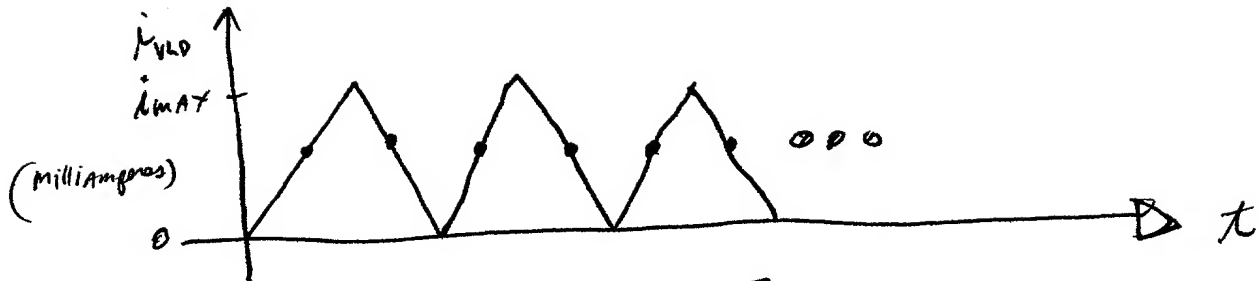


FIG. 1I15E

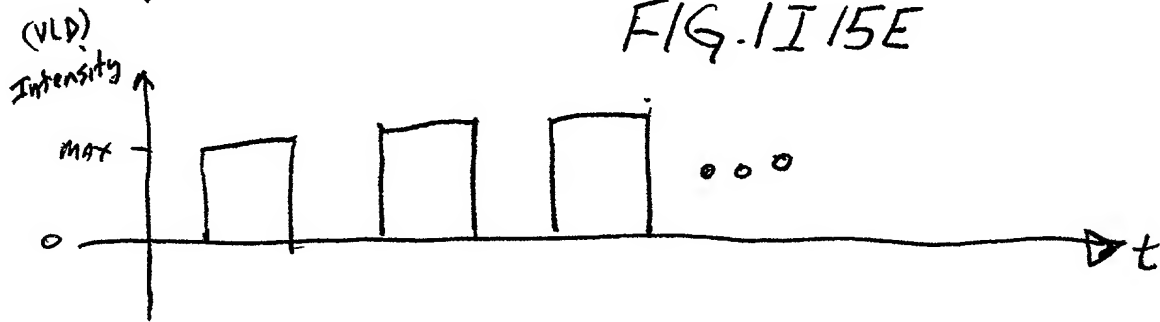


FIG. 1I15F

Third Generalized Method of  
Reducing Spackle-Noise Patterns  
at Image Detection Array  
of the FFD Subsystem (3)

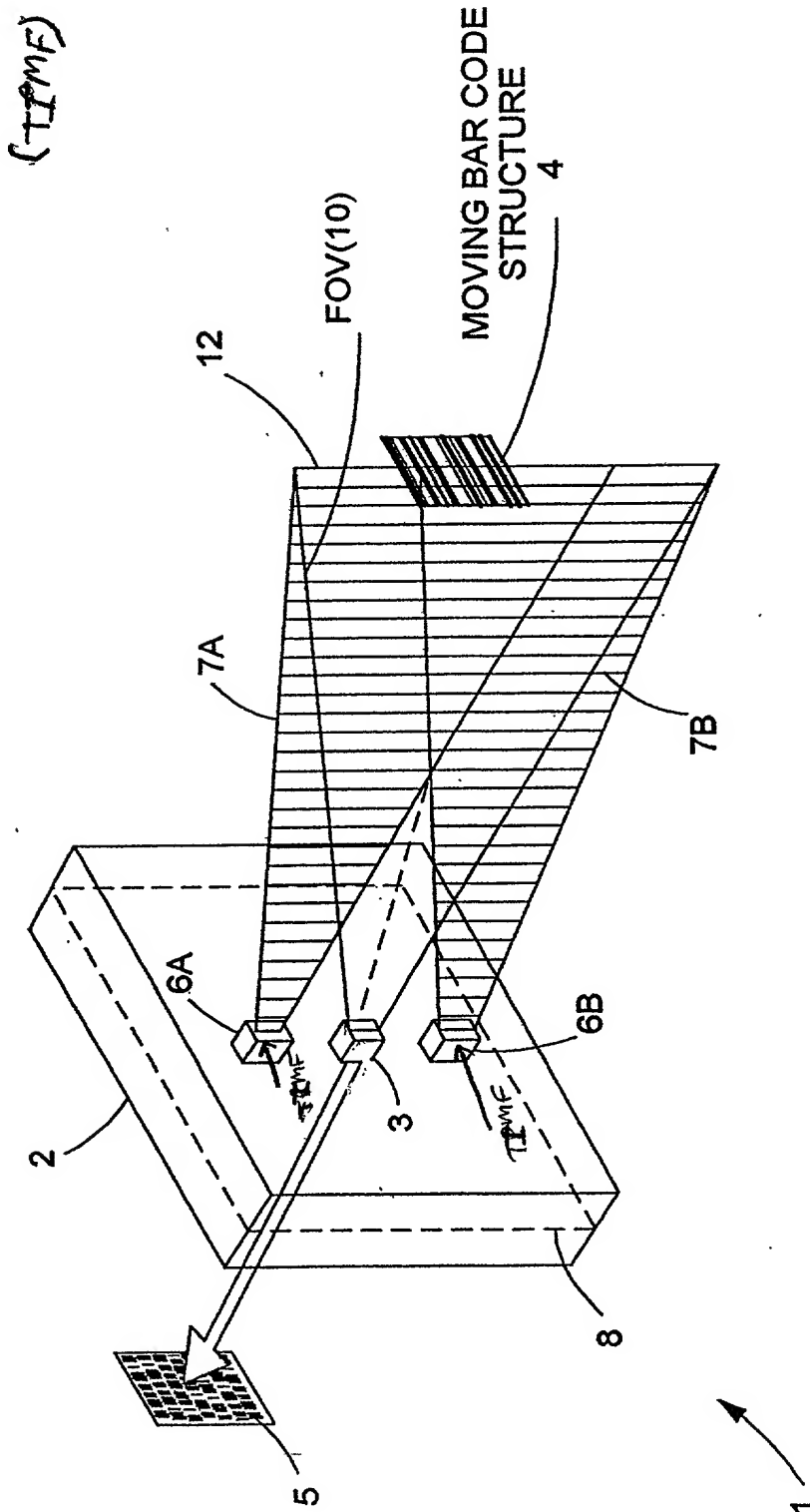


FIG. 1116

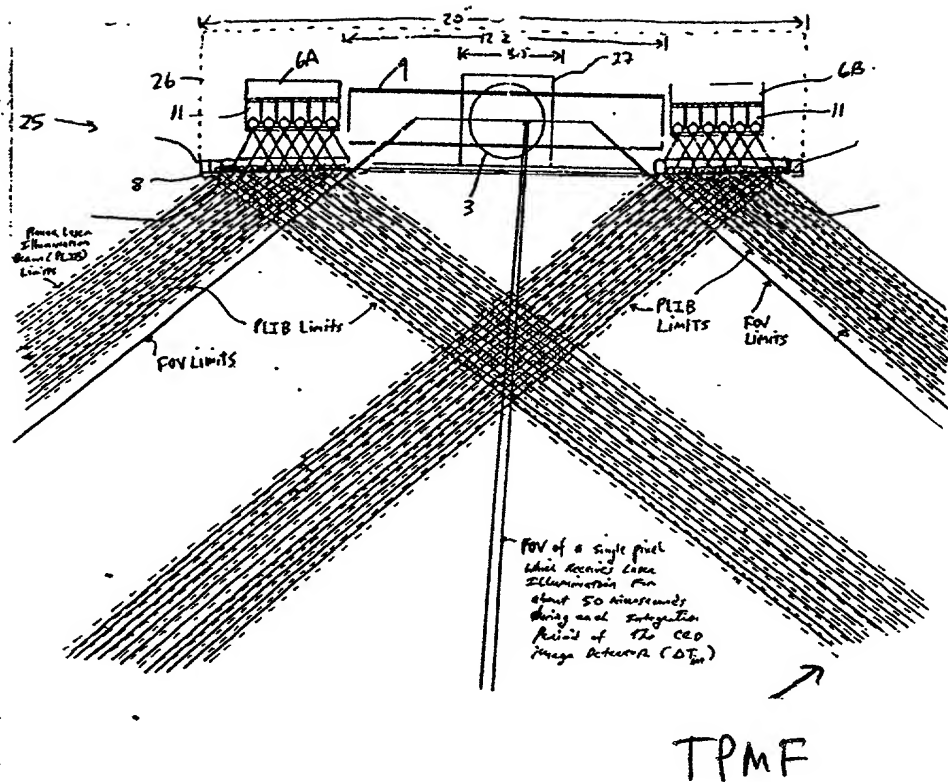


FIG. 1 I 16A

Third Generalized Speckle-Noise Pattern Reduction Method  
Of The Present Invention

Prior to illumination of the target with the planar laser illumination beam (PLIB), modulate the temporal *phase* of the transmitted PLIB ~~along the planar extent thereof~~ according to a *Temporal phase* modulation function (TPMF) so as to:

produce numerous substantially different time-varying speckle-noise patterns at the image detection array of the IFD Subsystem during the photo-integration time period thereof.

↓

Temporally average the numerous substantially different time-varying speckle-noise patterns produced at the image detection array in the IFD Subsystem during the photo-integration time period thereof, so as to thereby reduce power of the speckle-noise pattern observed at the image detection array.

FIG 1I/6B

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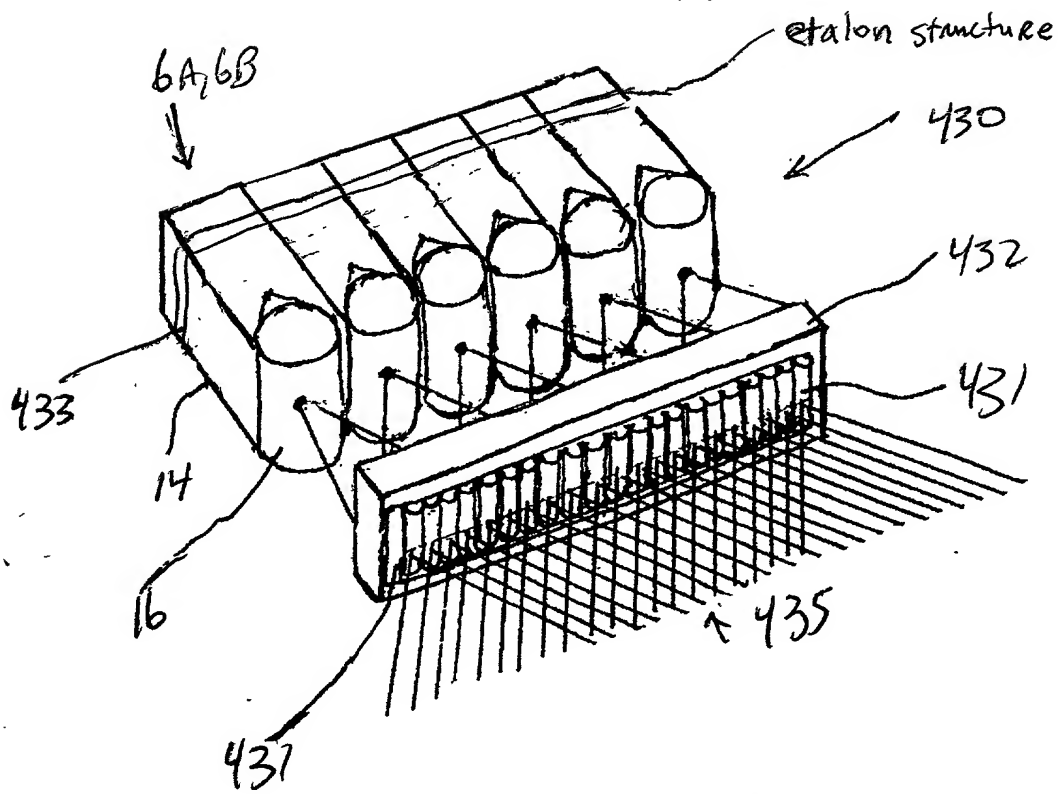


FIG. 1I17A

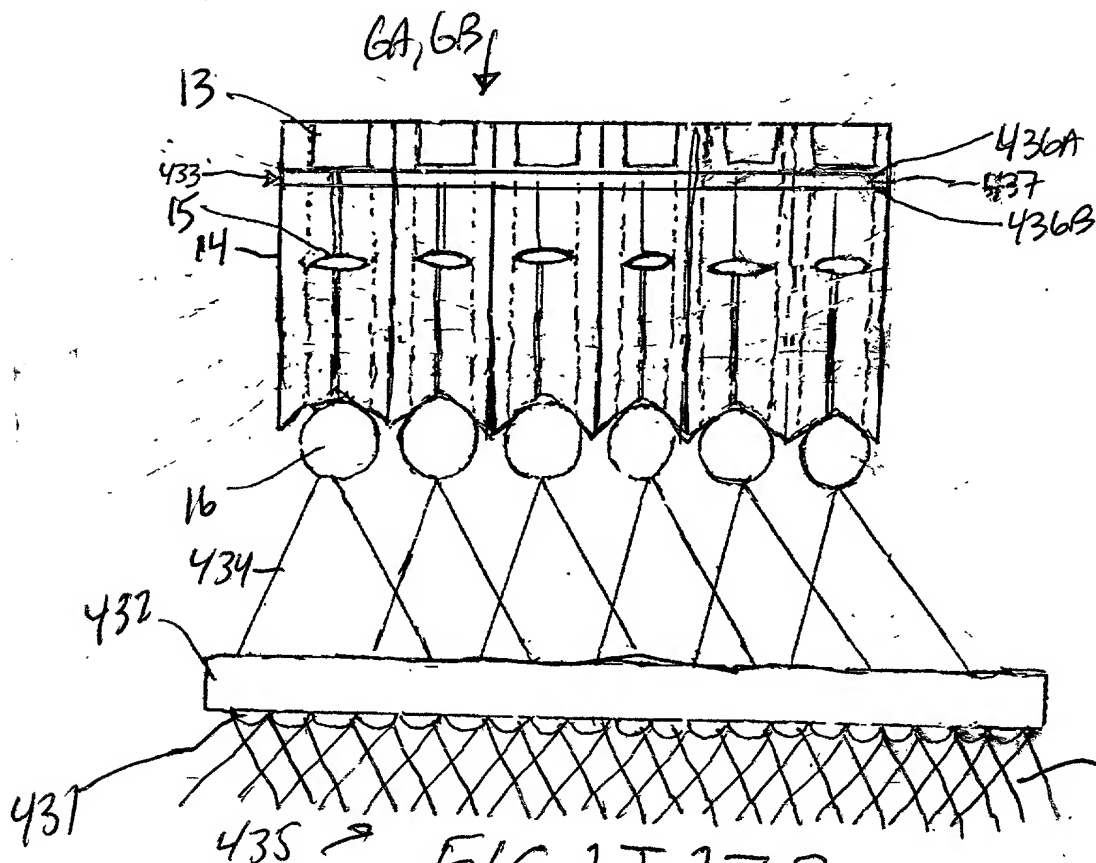


FIG. 1I17B



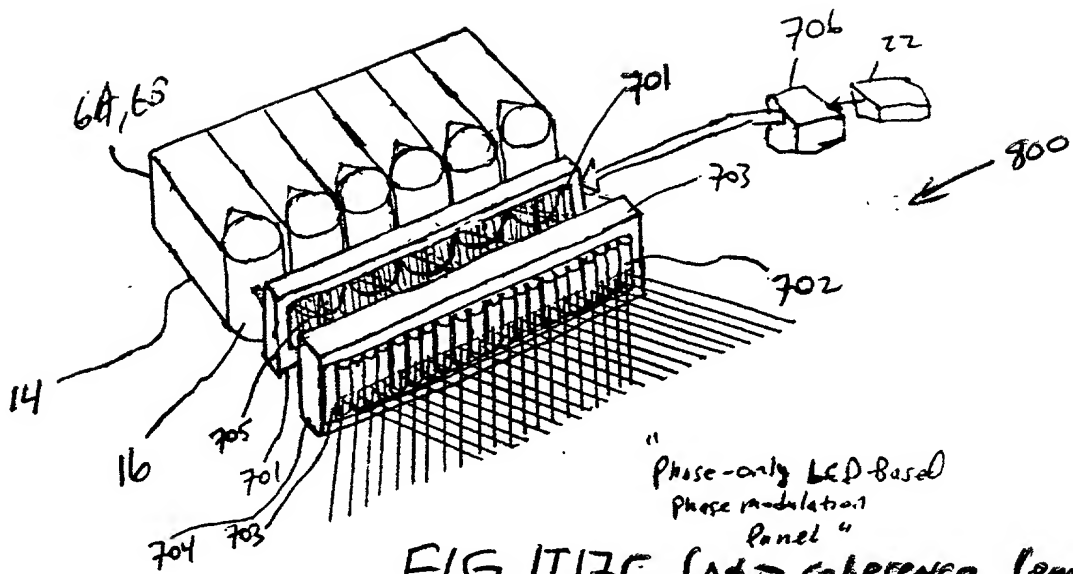


FIG. II7C ( $\Delta\phi >$  coherence length)  
of VLD

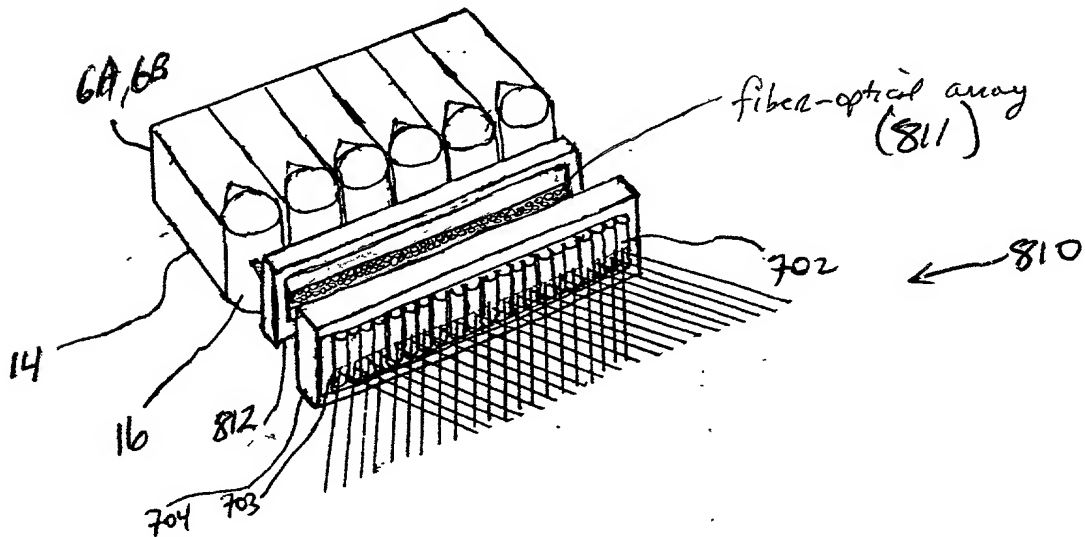


FIG. II7D

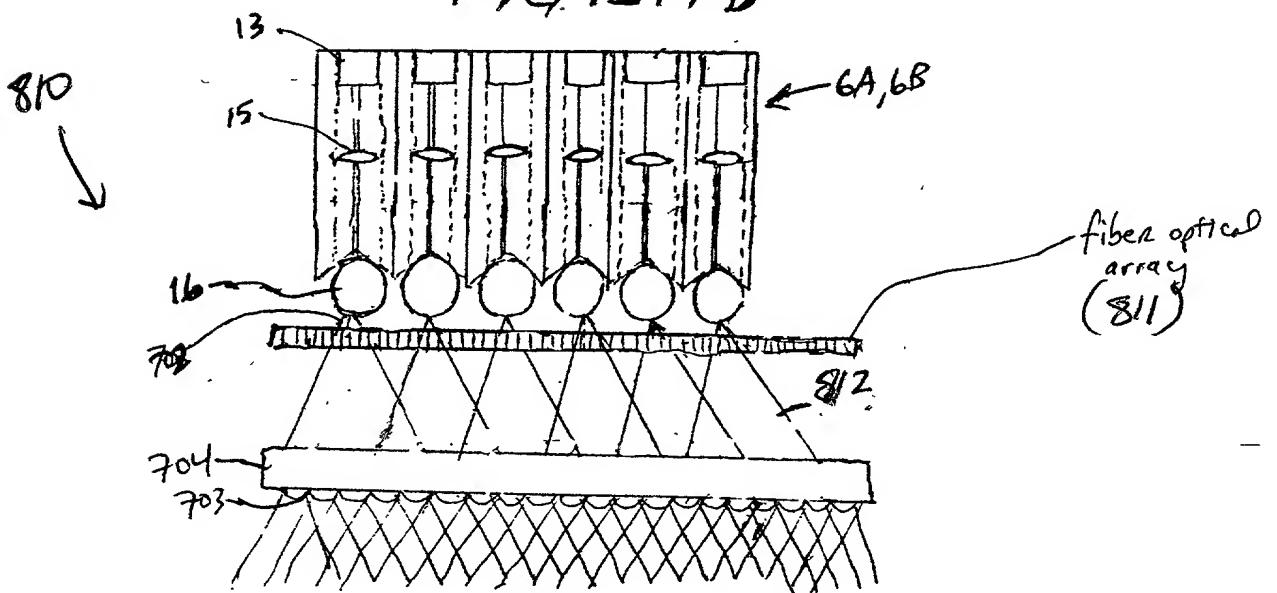


FIG. II7E

Fourth Generalized Method of  
Reducing Speckle-Noise Patterns  
at Image Detection Array  
of the FFD Subsystem (3)

(TFMP)

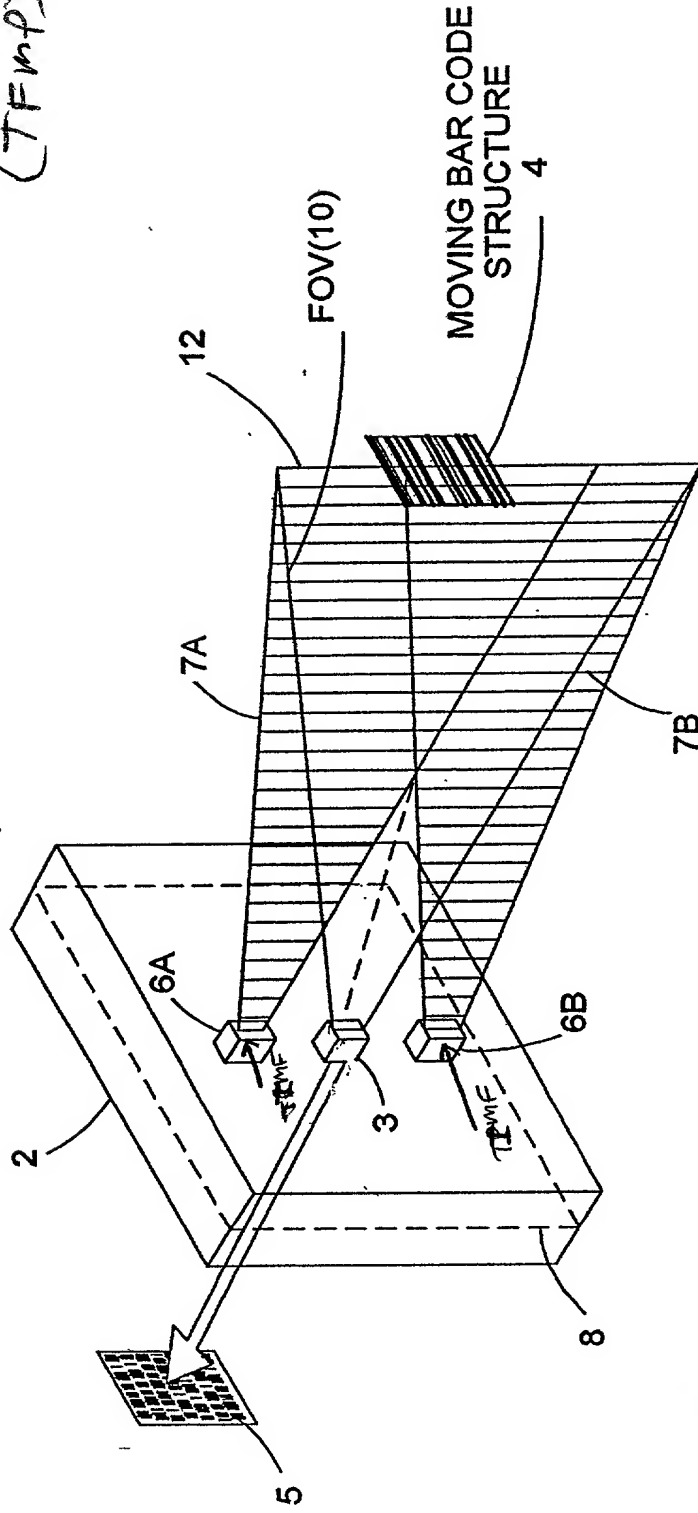


FIG. 1I18A



Fourth Generalized Speckle-Noise Pattern Reduction Method  
Of The Present Invention

Prior to illumination of the target with the planar laser illumination beam (PLIB), modulate the temporal frequency of the transmitted PLIB according to a temporal intensity modulation function (T IMF) so as to ;

produce numerous substantially different time-varying speckle-noise patterns at the image detection array of the IFD Subsystem during the photo-integration time period thereof.

Temporally average the numerous substantially different time-varying speckle-noise patterns produced at the image detection array in the IFD Subsystem during the photo-integration time period thereof, so as to thereby reduce power of the speckle-noise pattern observed at the image detection array.

FIG. 1118B

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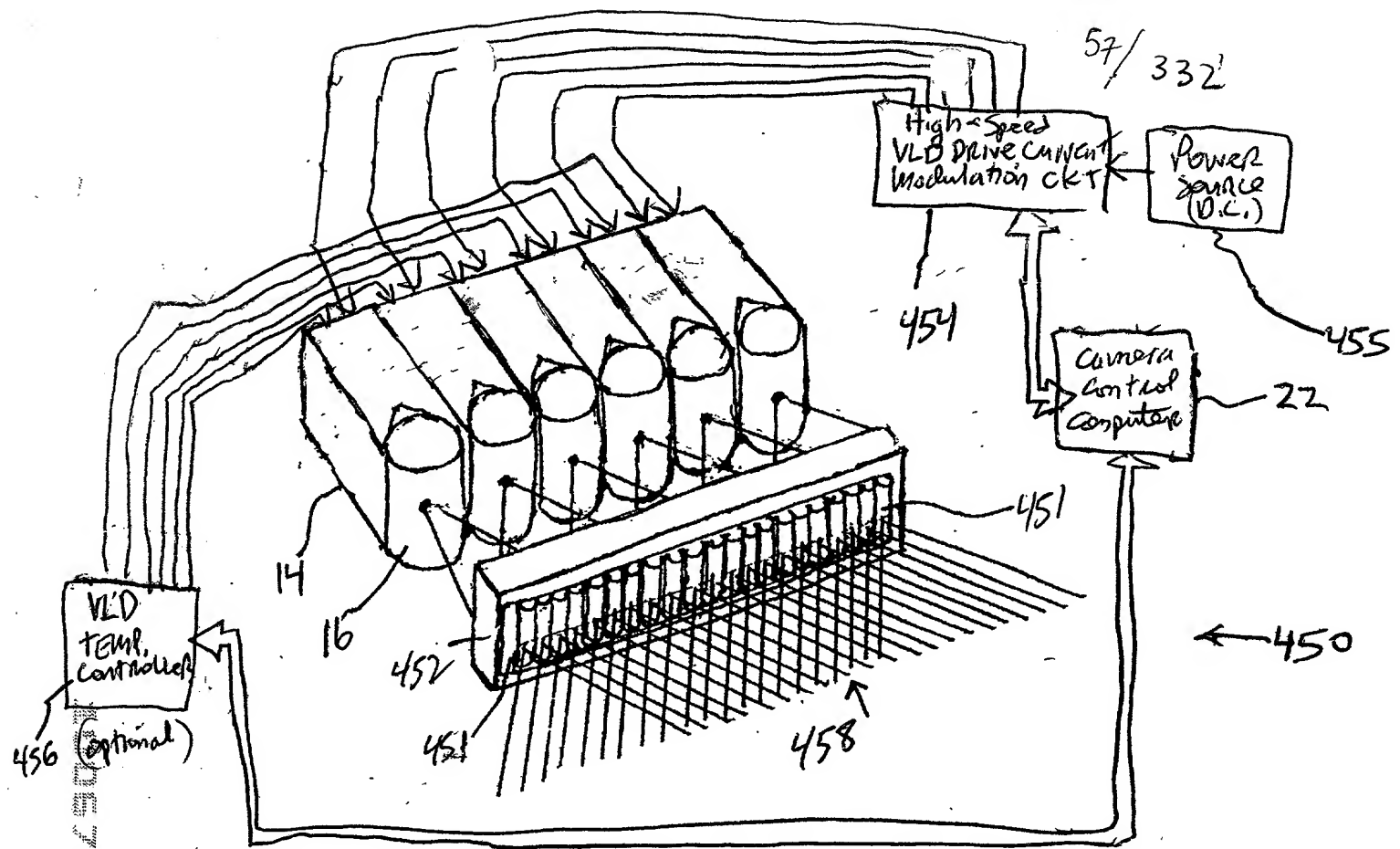


FIG. 1I 19A

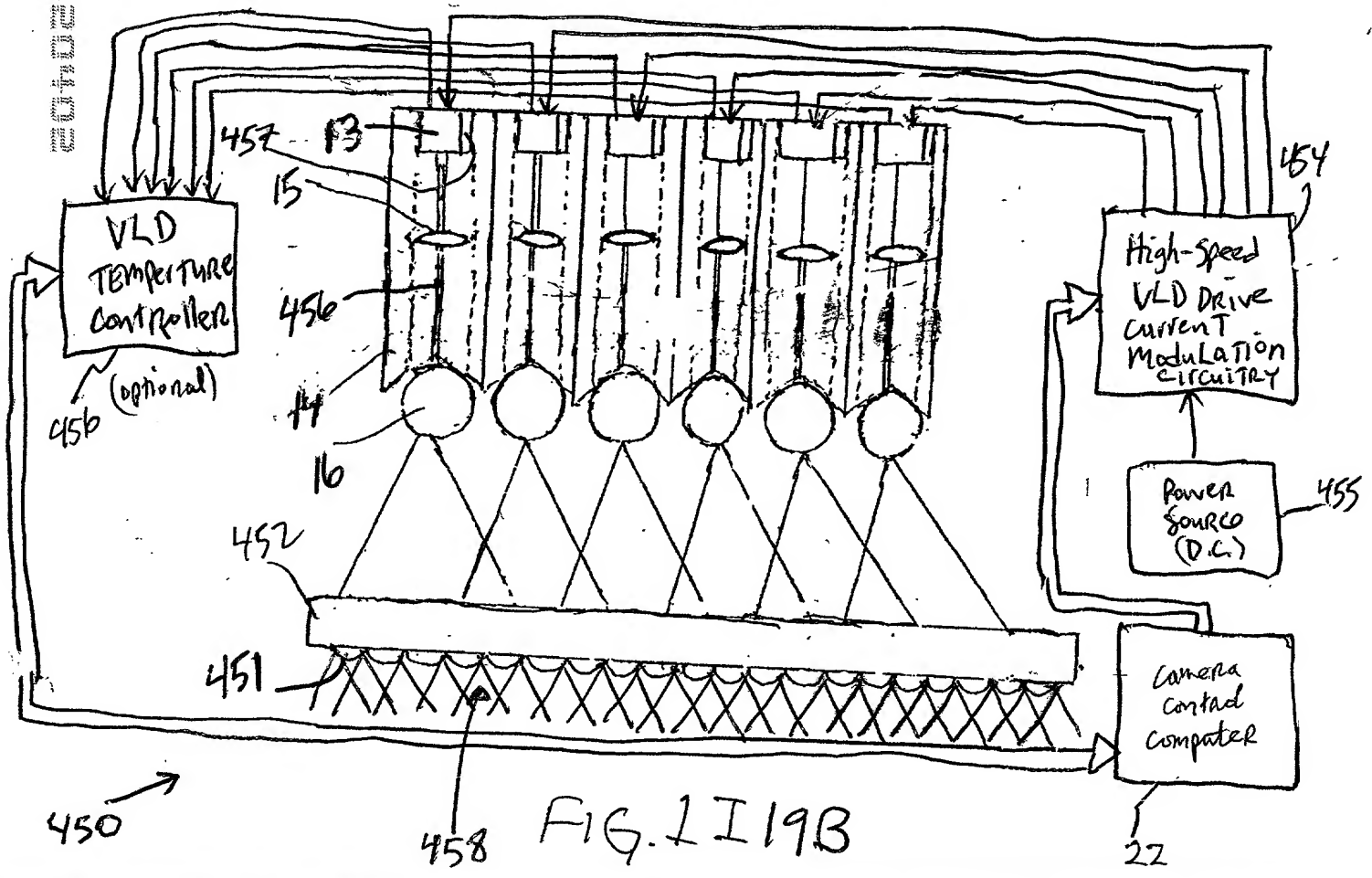


FIG. 1I 19B

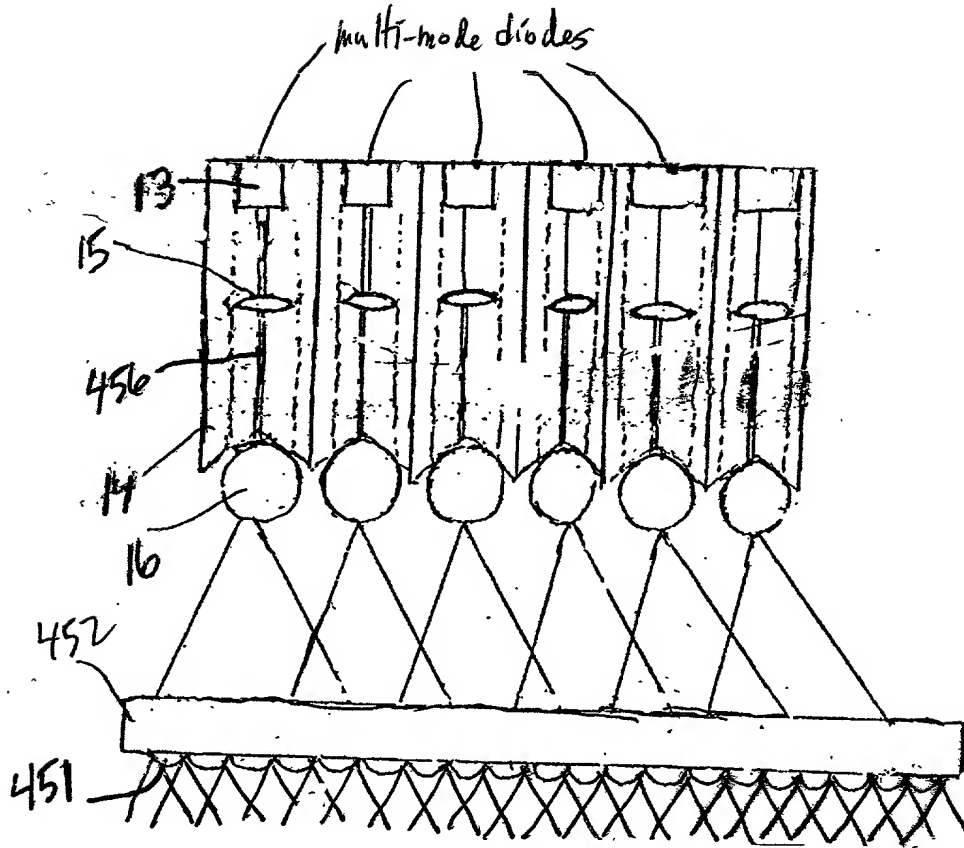


FIG 1I19C

FIFTH GENERALIZED METHOD  
OF REDUCING SPECKLE-NOISE  
PATTERNS AT IMAGE  
DETECTION ARRAY OF THE  
FFD SUBSYSTEM (3)

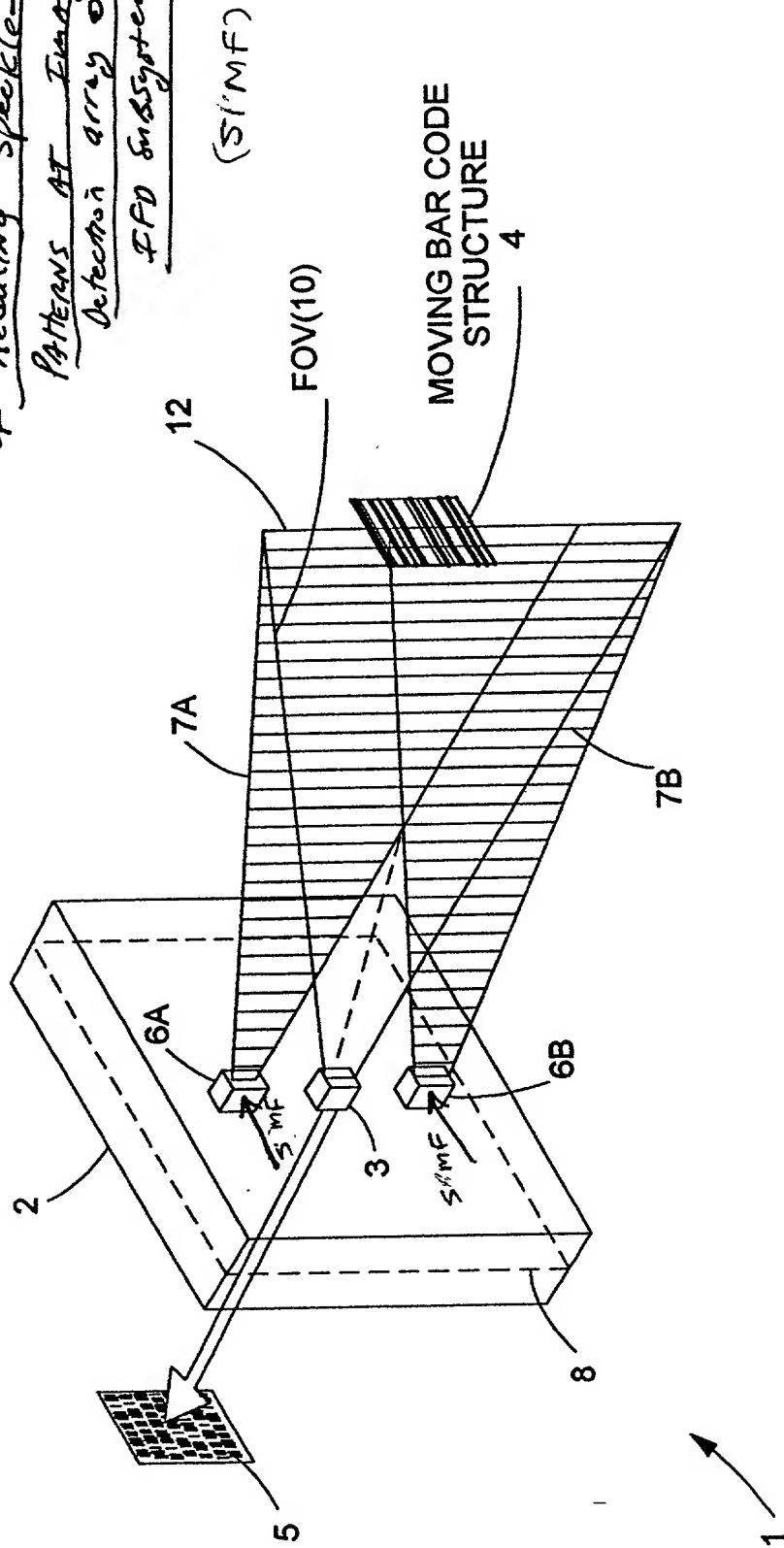


FIGURE 20





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Fifth Generalized Speckle-Noise Pattern Reduction Method  
Of The Present Invention

Prior to illumination of the target with the planar laser illumination beam (PLIB), modulate the spatial intensity of the transmitted PLIB along the planar extent thereof according to a spatial intensity modulation function (SIMF) so as to

produce numerous substantially different time-varying speckle-noise patterns at the image detection array of the IFD Subsystem during the photo-integration time period thereof.

A

Temporally average the numerous substantially different time-varying speckle-noise patterns produced at the image detection array in the IFD Subsystem during the photo-integration time period thereof, so as to thereby reduce power of the speckle-noise pattern observed at the image detection array.

B

FIG. 1I20B

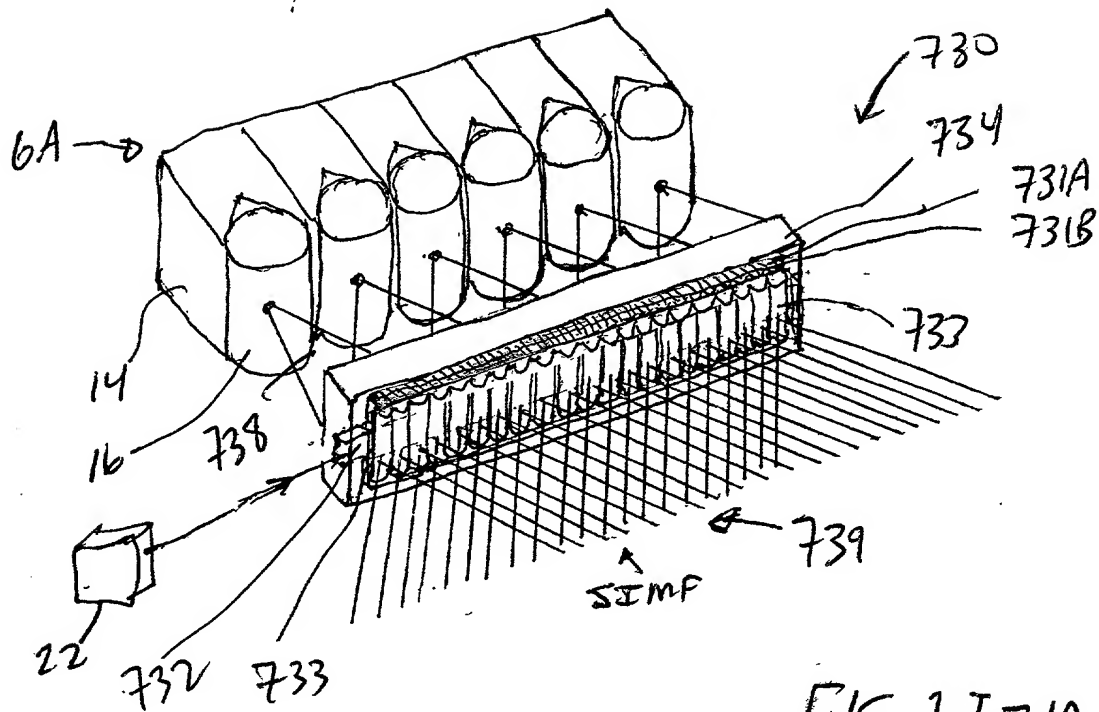


FIG. 1I2IA

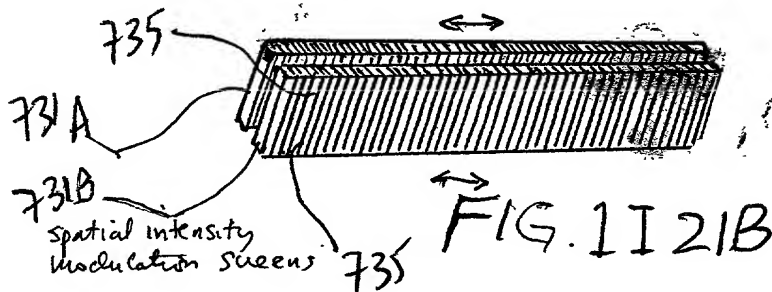


FIG. 1I2IB

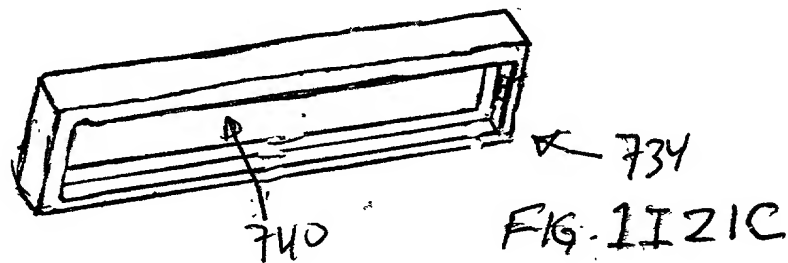


FIG. 1I2IC

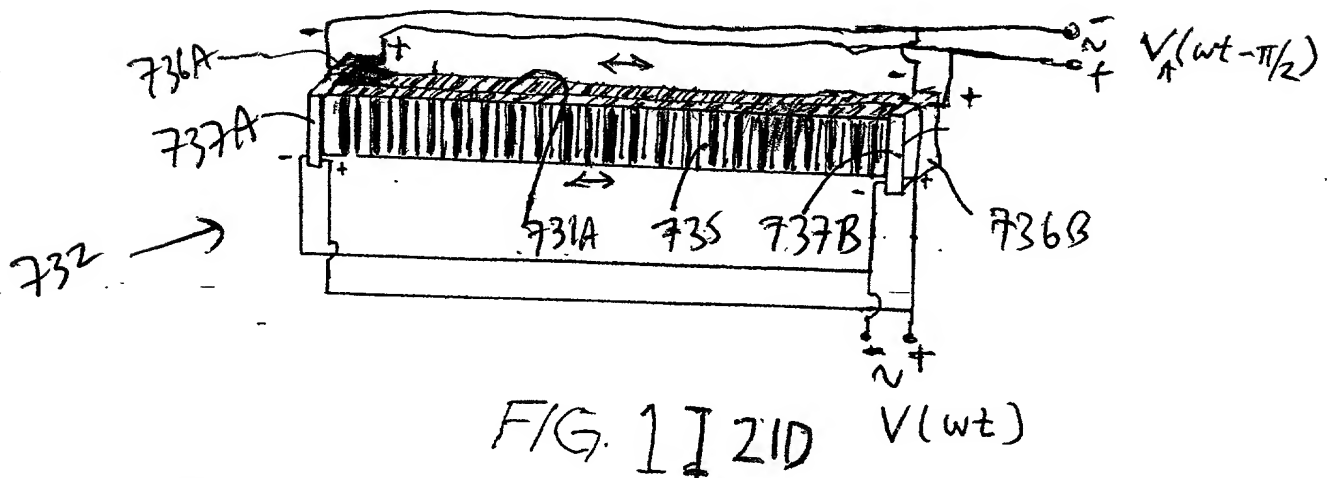


FIG. 1I2ID

Generalized Method of  
Reducing Speckle-Noise Patterns  
at Image Detection array  
of the IFD Subsystem

(SIMF)

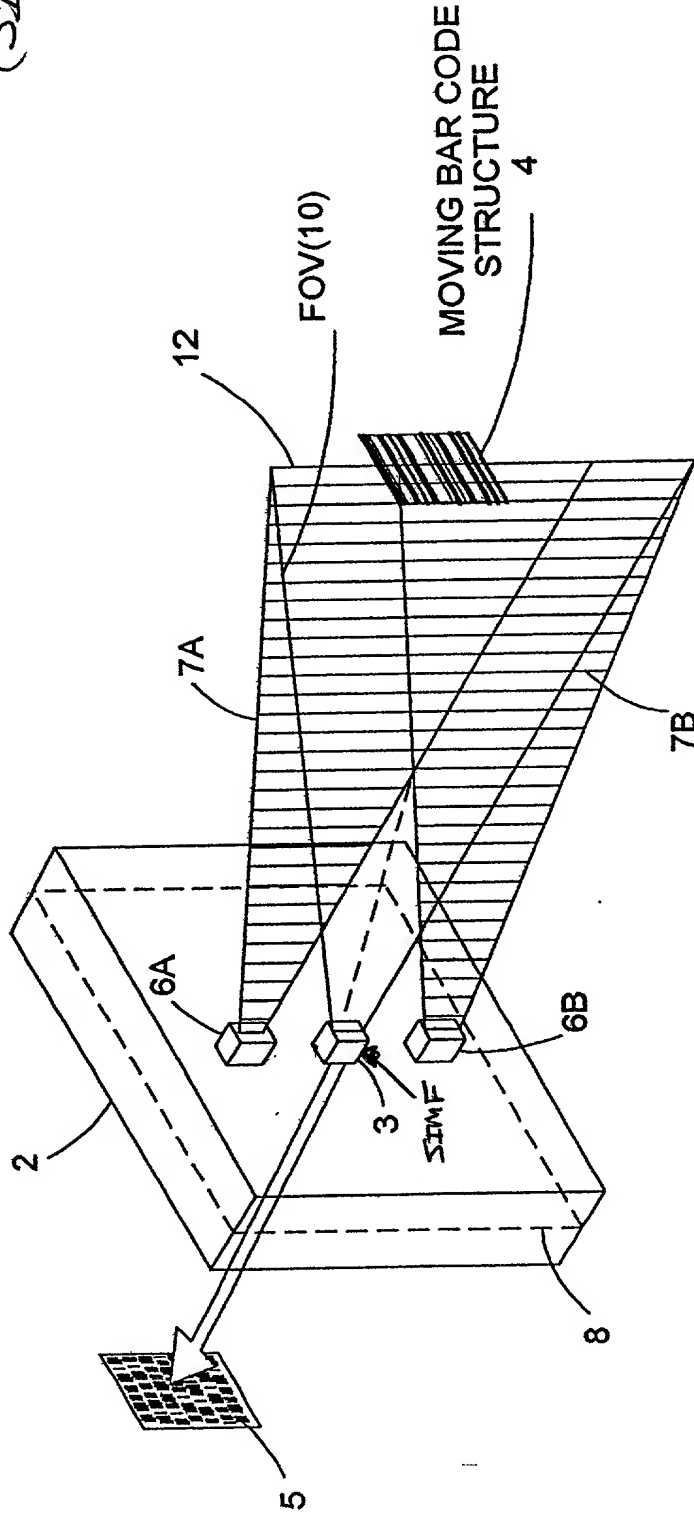


FIG. 1I 22

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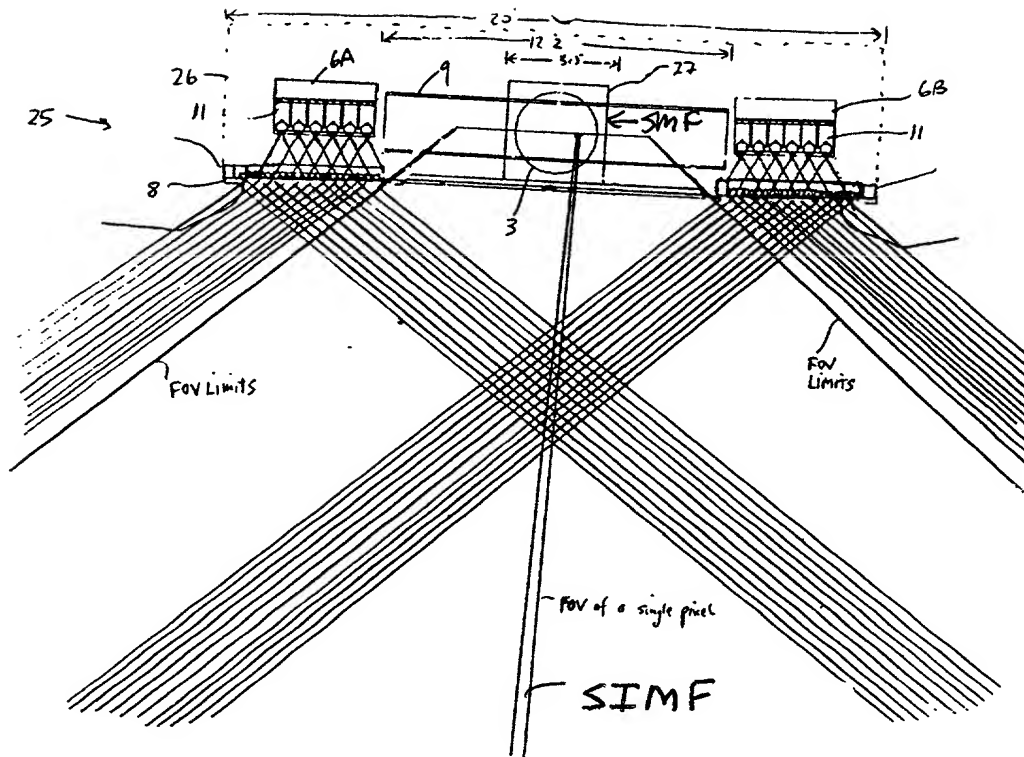


FIG. 1122A

Sixth Generalized Speckle-Noise Pattern Reduction Method  
Of The Present Invention

After illumination of the target with the planar laser illumination beam (PLIB), modulate the spatial intensity of the reflected/scattered (i.e. received) PLIB along the planar extent thereof according to a spatial intensity modulation function (SIMF) so as to .

produce numerous substantially different time-varying speckle-noise patterns at the image detection array of the IFD Subsystem during the photo-integration time period thereof.

Temporally average the many substantially different time-varying speckle-noise patterns produced at the image detection array in the IFD Subsystem during the photo-integration time period thereof, so as to thereby reduce the speckle-noise pattern observed at the image detection array.

FIG. 1I 22B

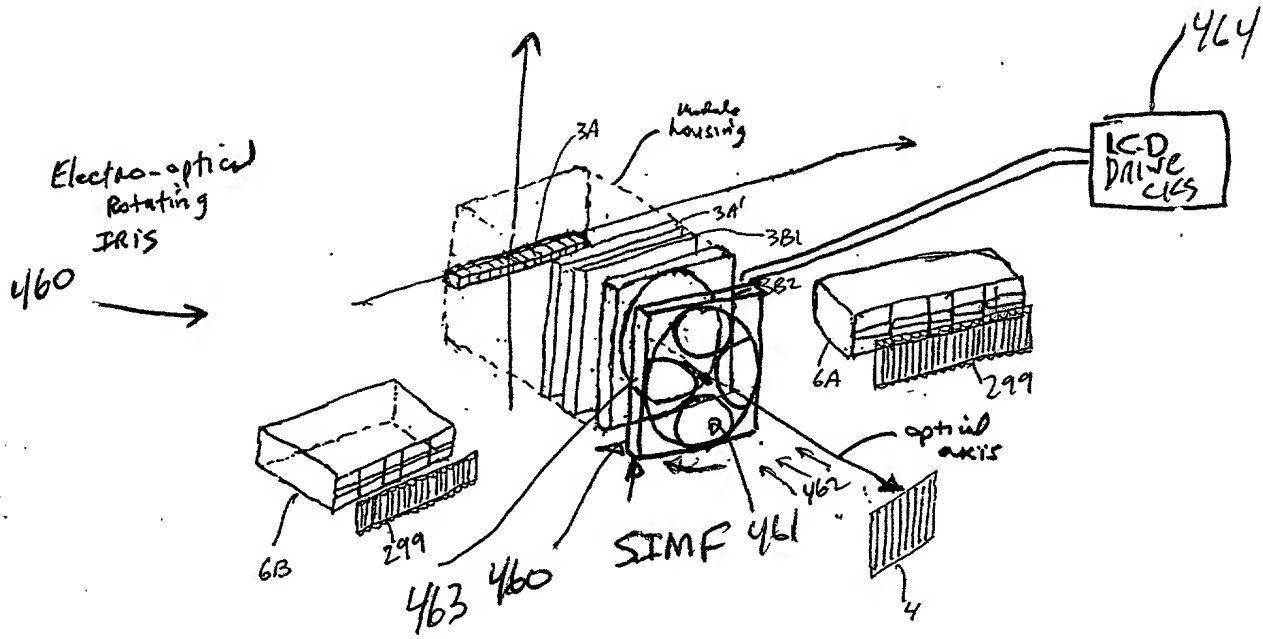


FIG. 1I 23A

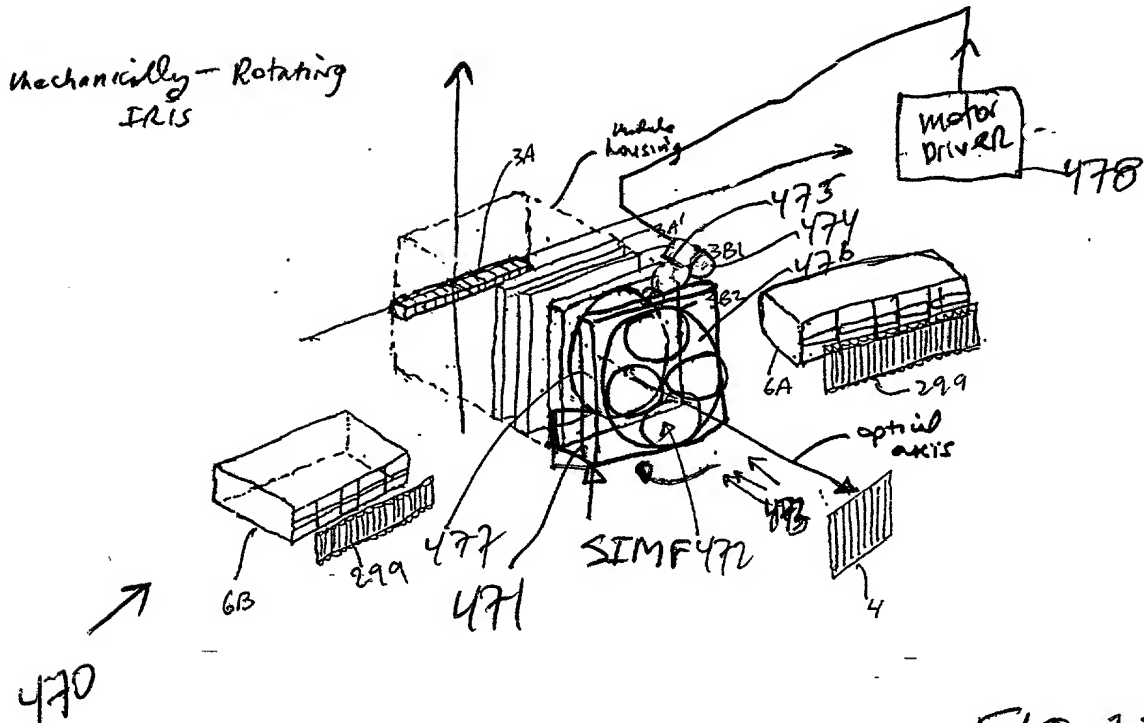


FIG. 1I 23B

Seventh Generalized Method of  
Reducing Speckle-Noise Patterns  
at Image Detection Array  
of IR IFD Subsystem

(TIME)

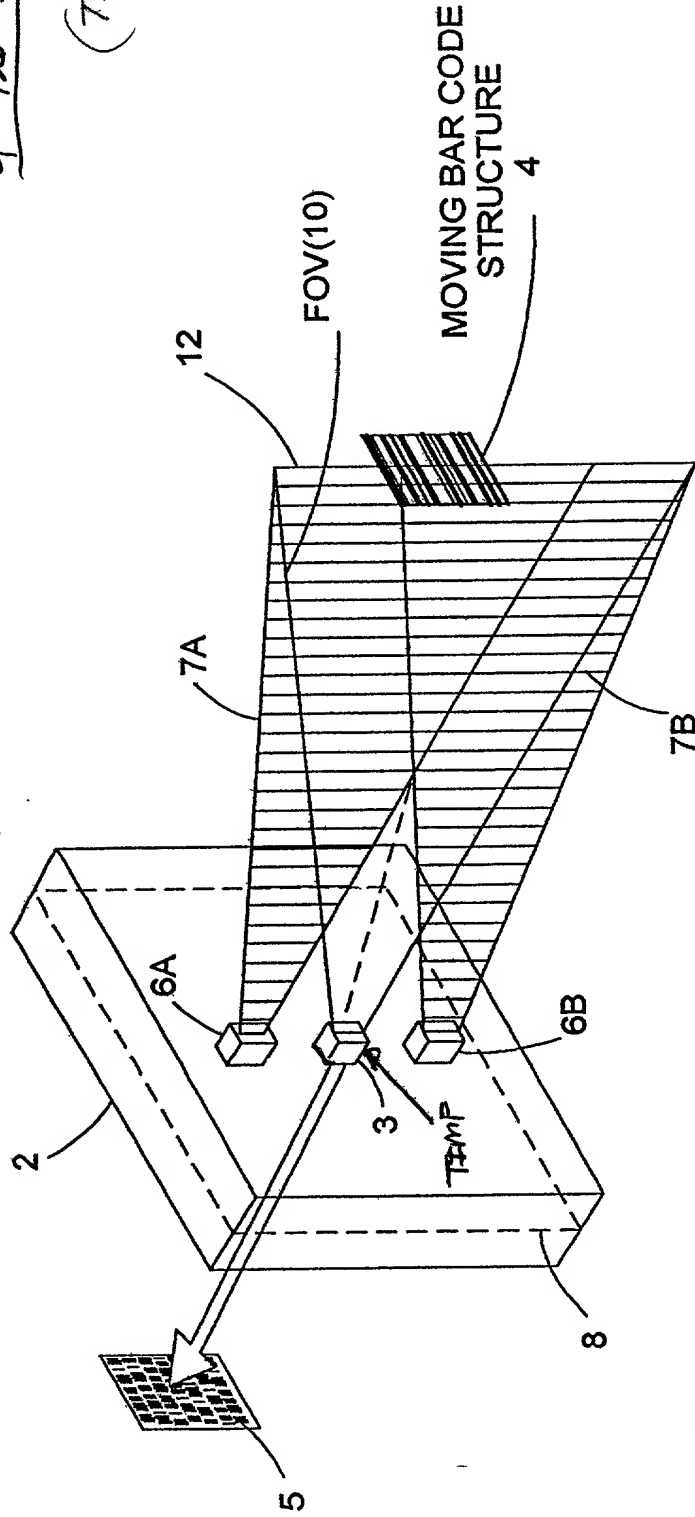


FIG. 1124

*[Faint, illegible handwritten notes]*





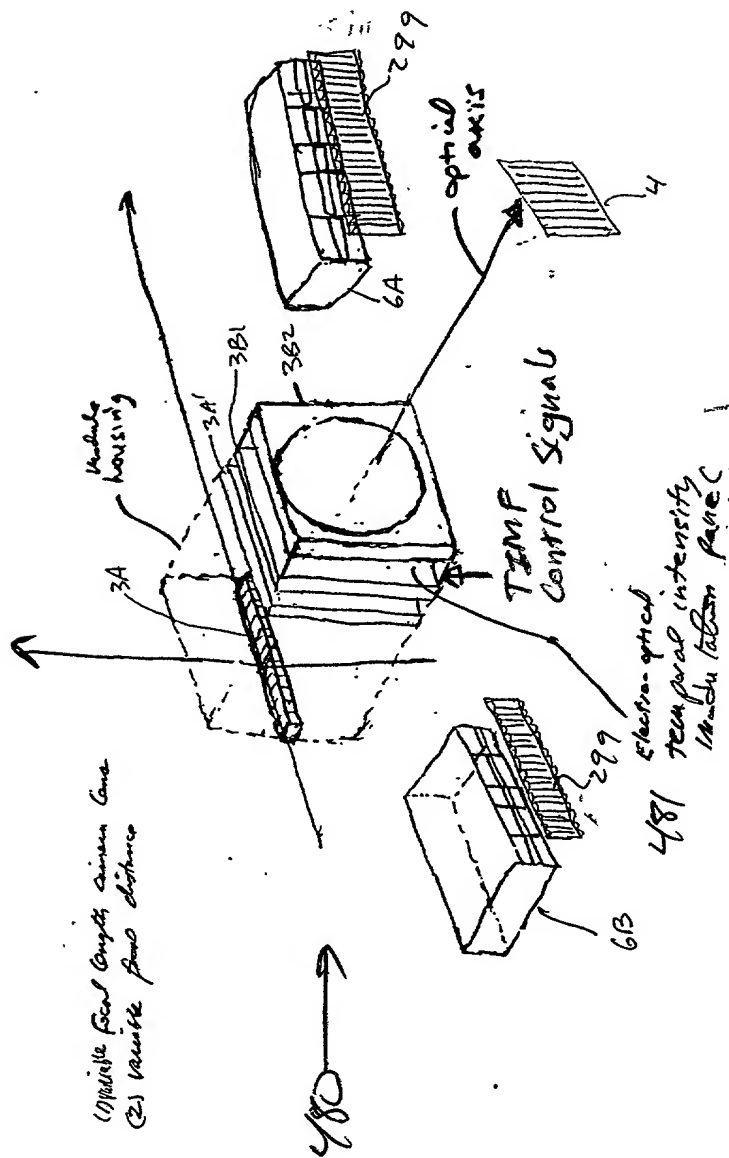
Seventh Generalized Speckle-Noise Pattern Reduction Method  
Of The Present Invention

After illumination of the target with the planar laser illumination beam (PLIB), modulate the temporal intensity of the reflected/scattered (i.e. received) PLIB along the planar extent thereof according to a temporal intensity modulation function (TIMF) so as to

produce many substantially different time-varying speckle-noise patterns at the image detection array of the IFD Subsystem during the photo-integration time period thereof.

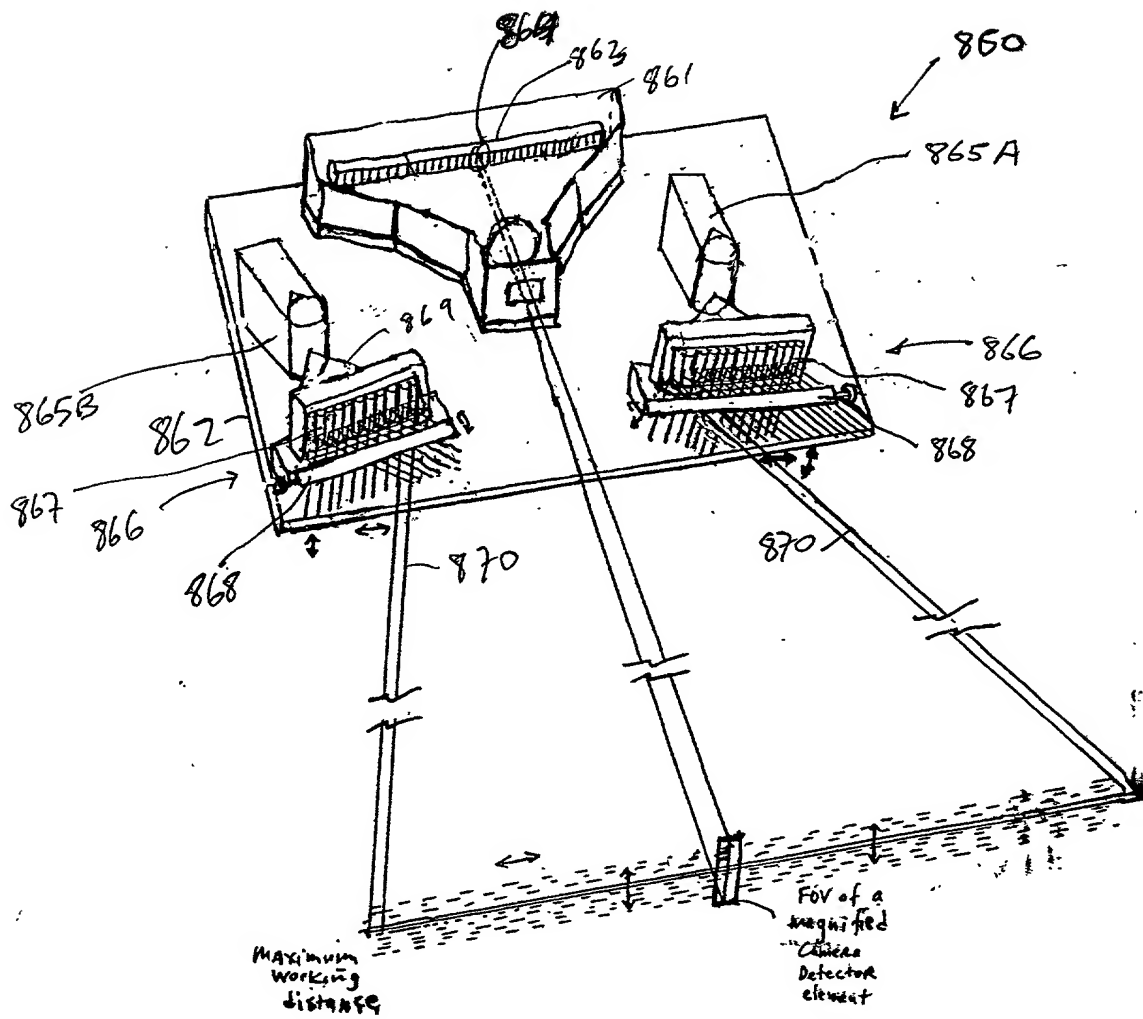
Temporally average the many substantially different time-varying speckle-noise patterns produced at the image detection array in the IFD Subsystem during the photo-integration time period thereof, so as to thereby reduce the speckle-noise pattern observed at the image detection array.

FIG. 1I 24B



AG 1124C

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\* Lateral and Transverse Microoscillation of PLIB

FIG. 1I25A1

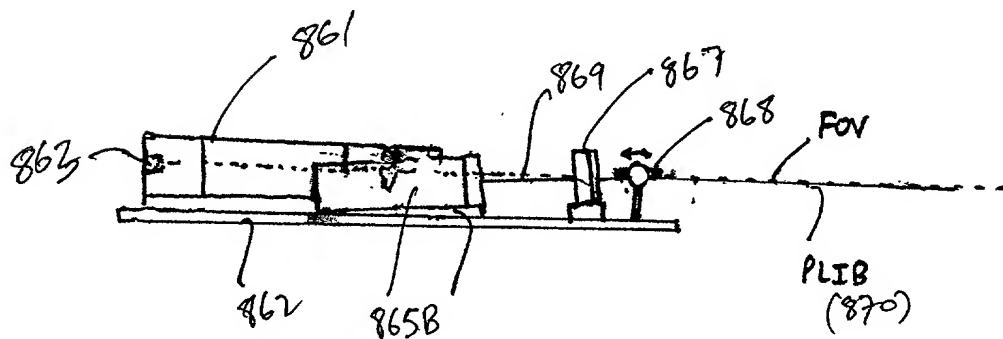
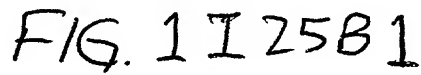
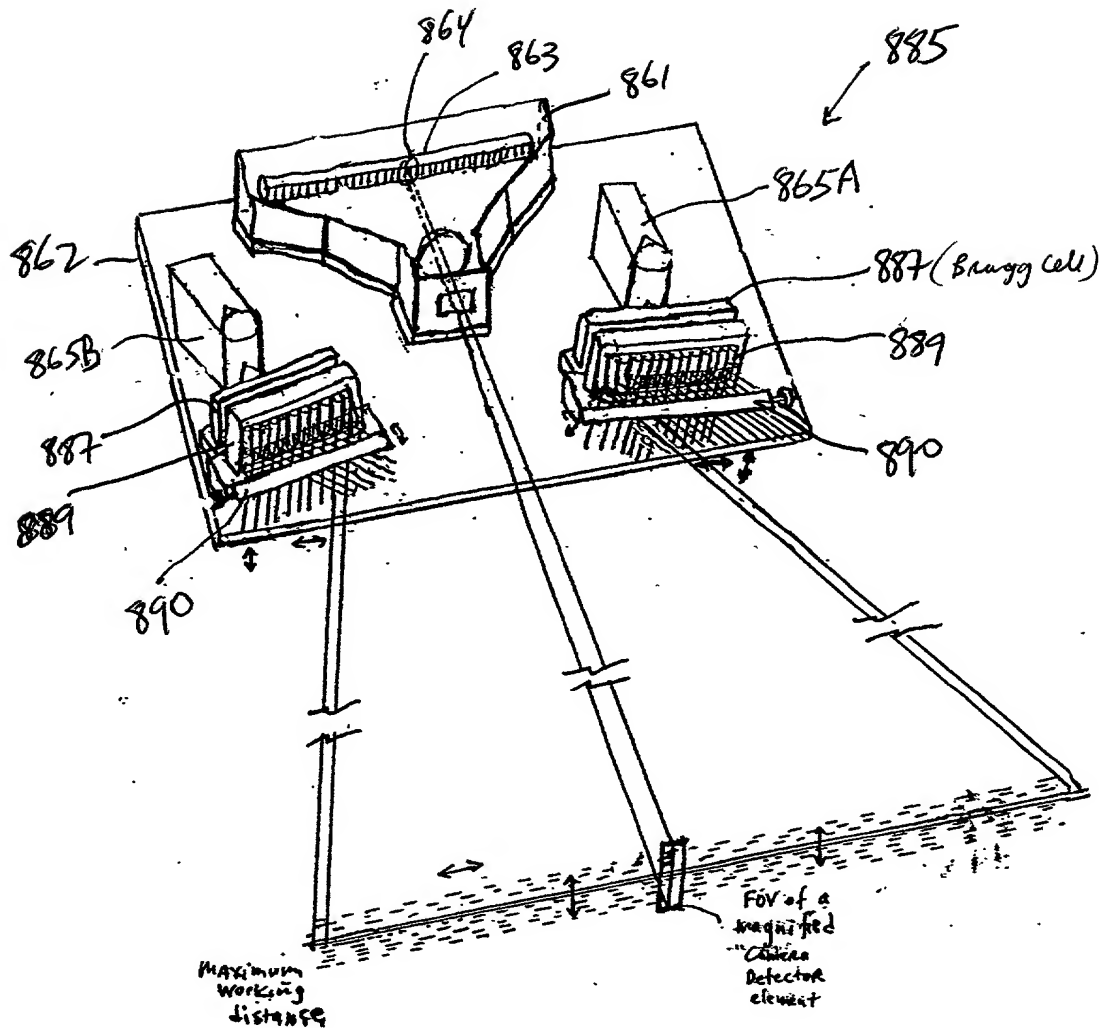


FIG. 1I25A2

[illegible]



\* Lateral and Transverse Microoscillation of PLIB

FIG. 1I25C1

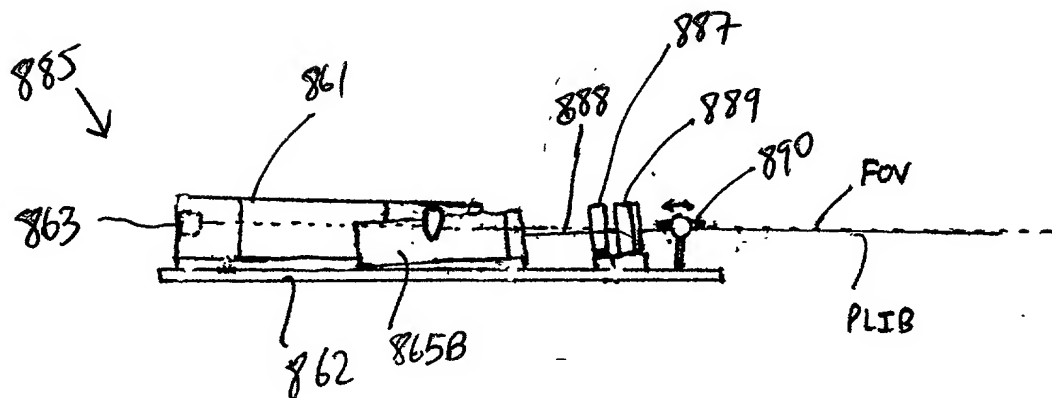
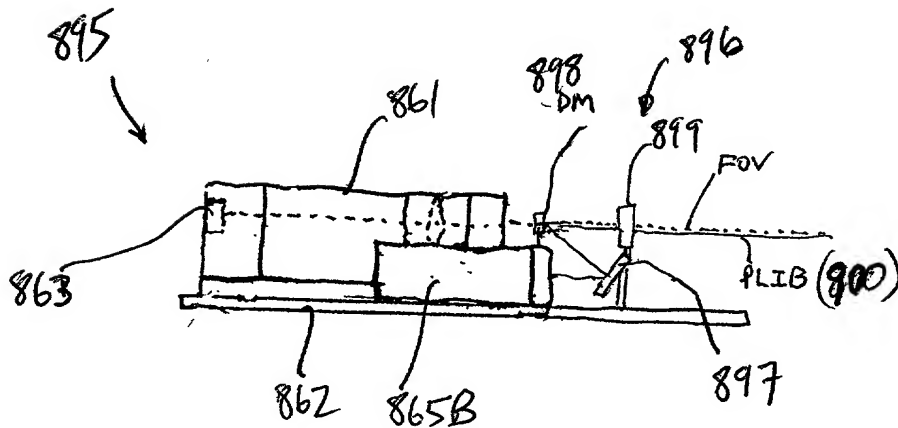
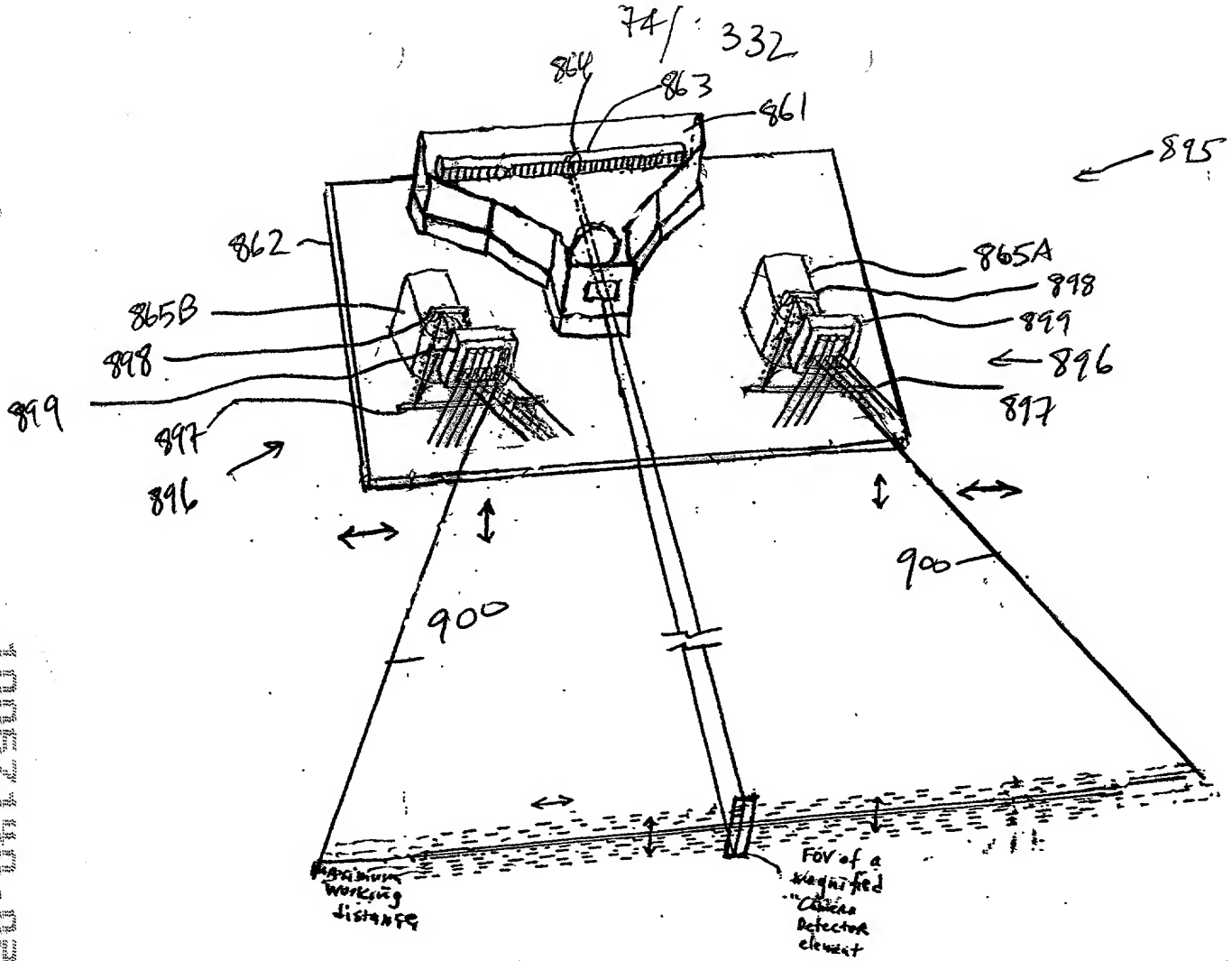


FIG. 1I25C2



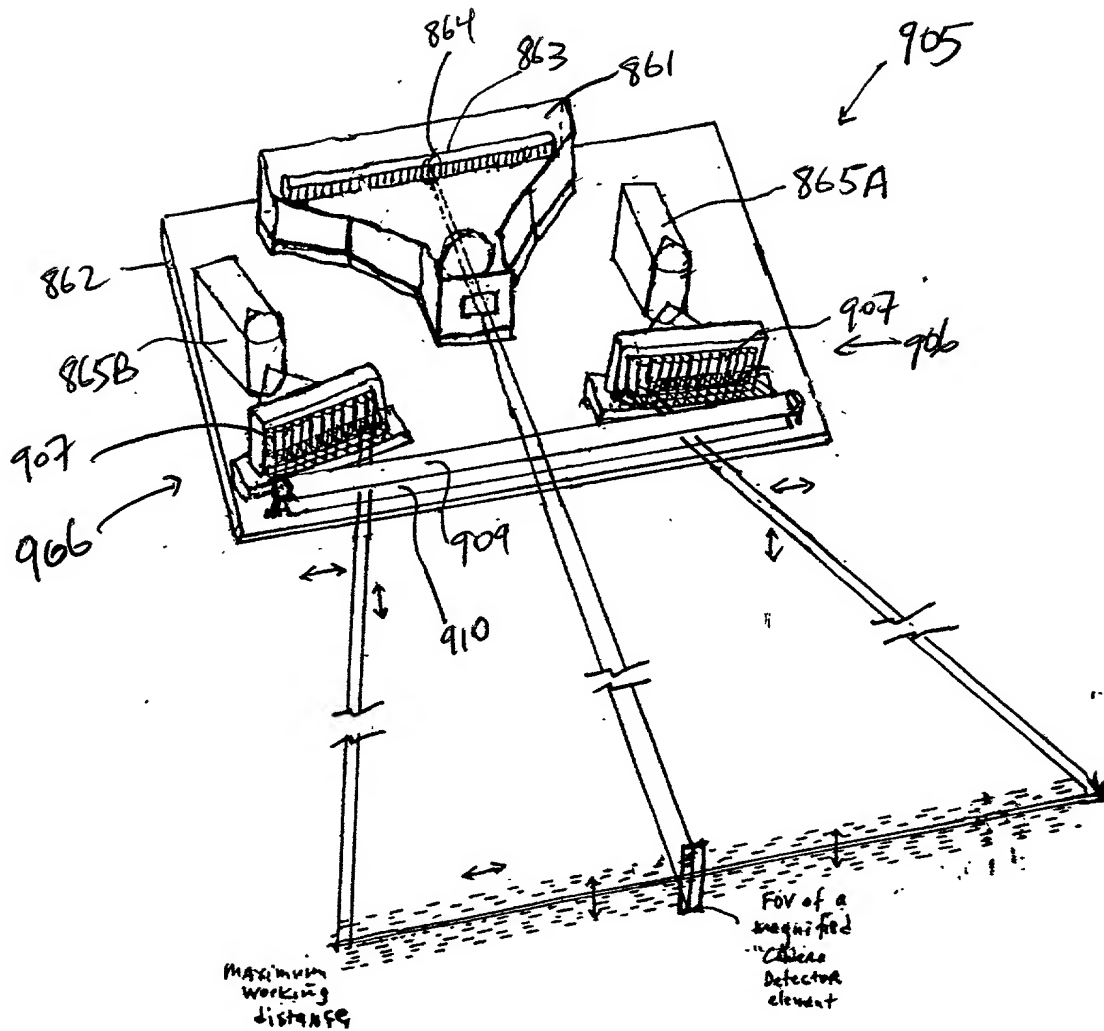


FIG. 1I25E1

\* Lateral and Transverse Microoscillation of PLIB

905

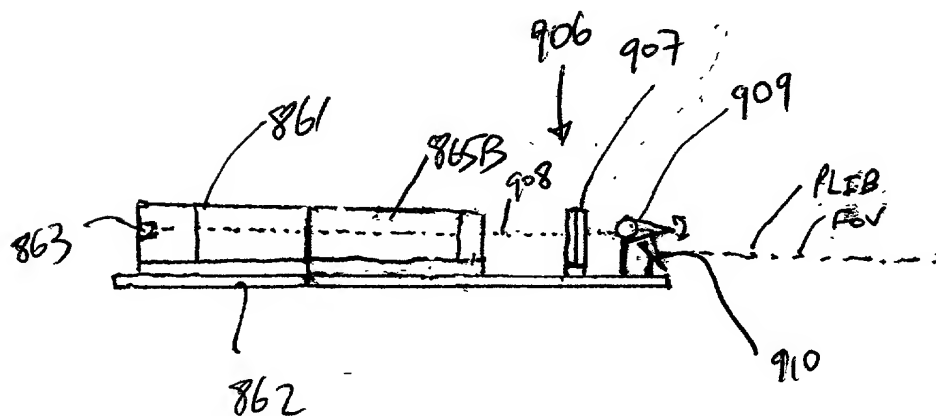


FIG. 1I25E2

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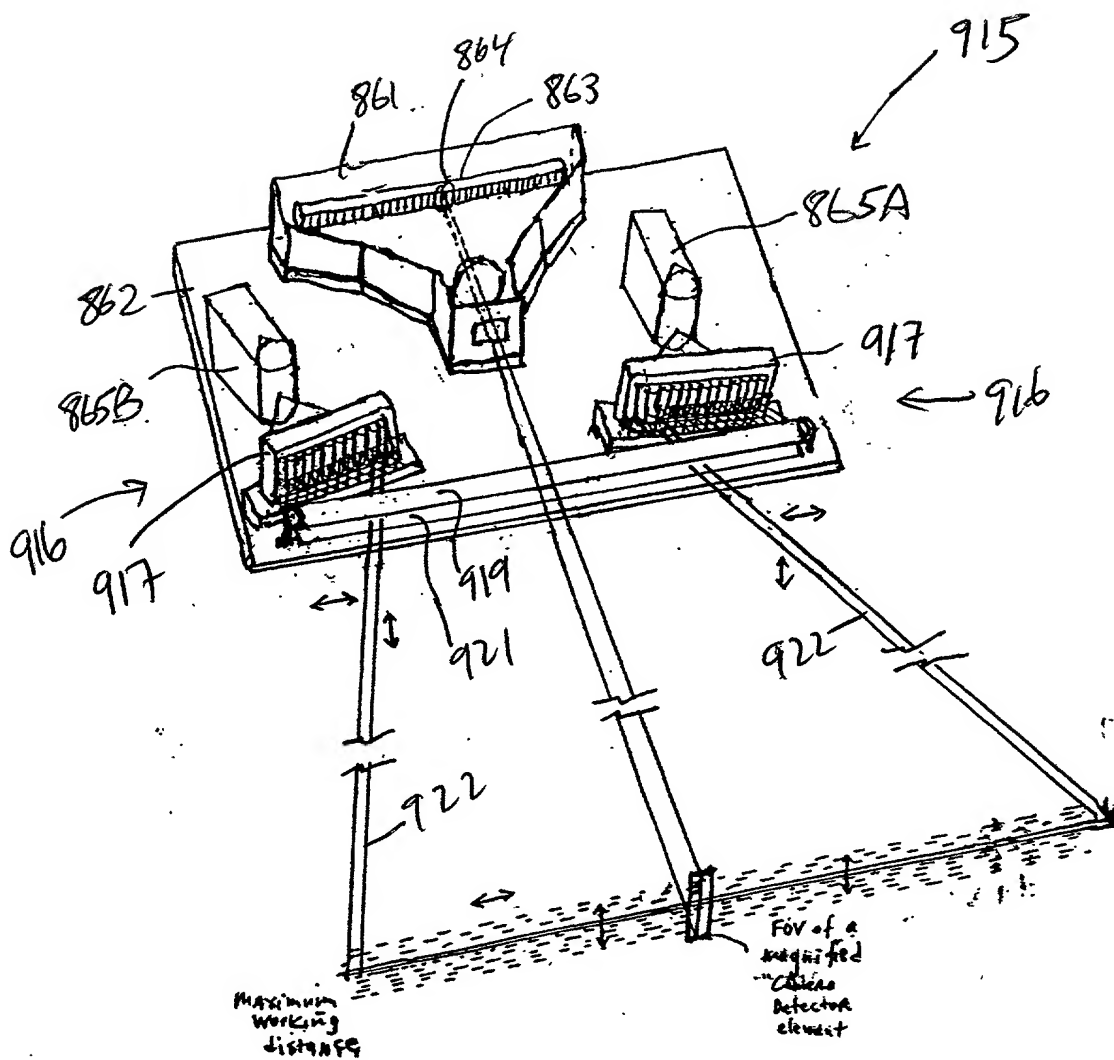


FIG. 1I25F1

\* Lateral and Transverse Misalignment of PLB

915

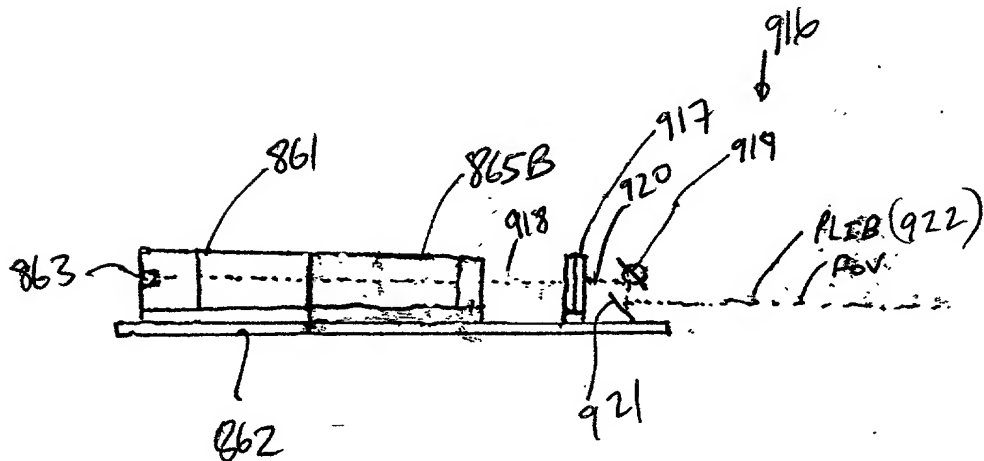
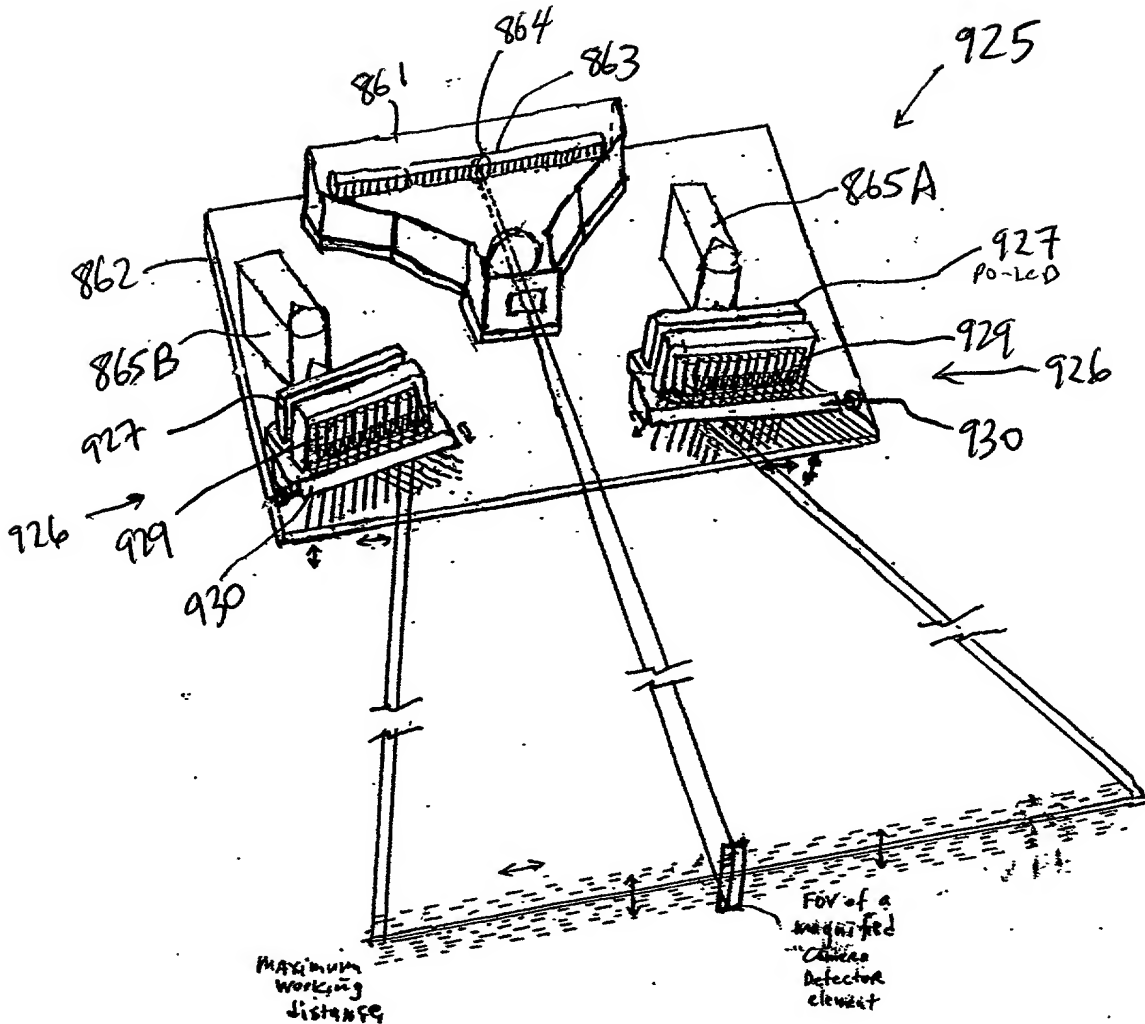


FIG. 1I25F2



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\* Lateral and Transverse Microoscillation of PLIB

925

FIG. 1I25G1

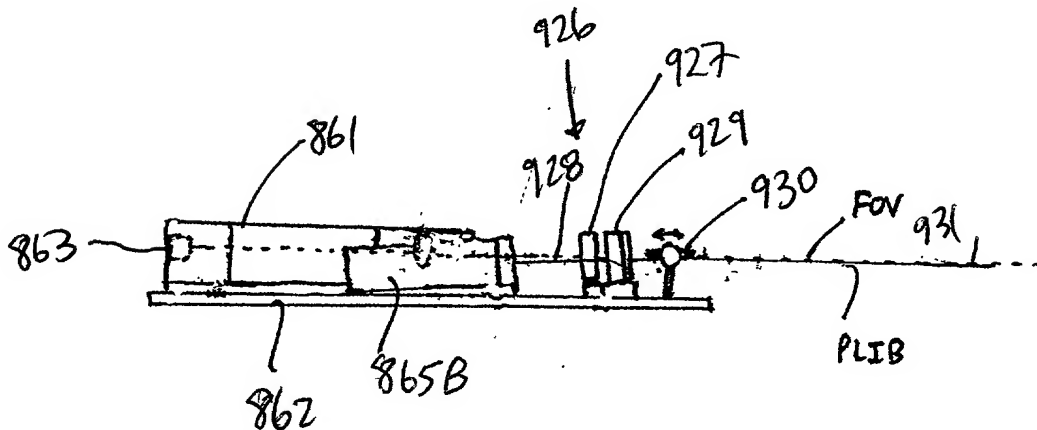


FIG. 1I25G2

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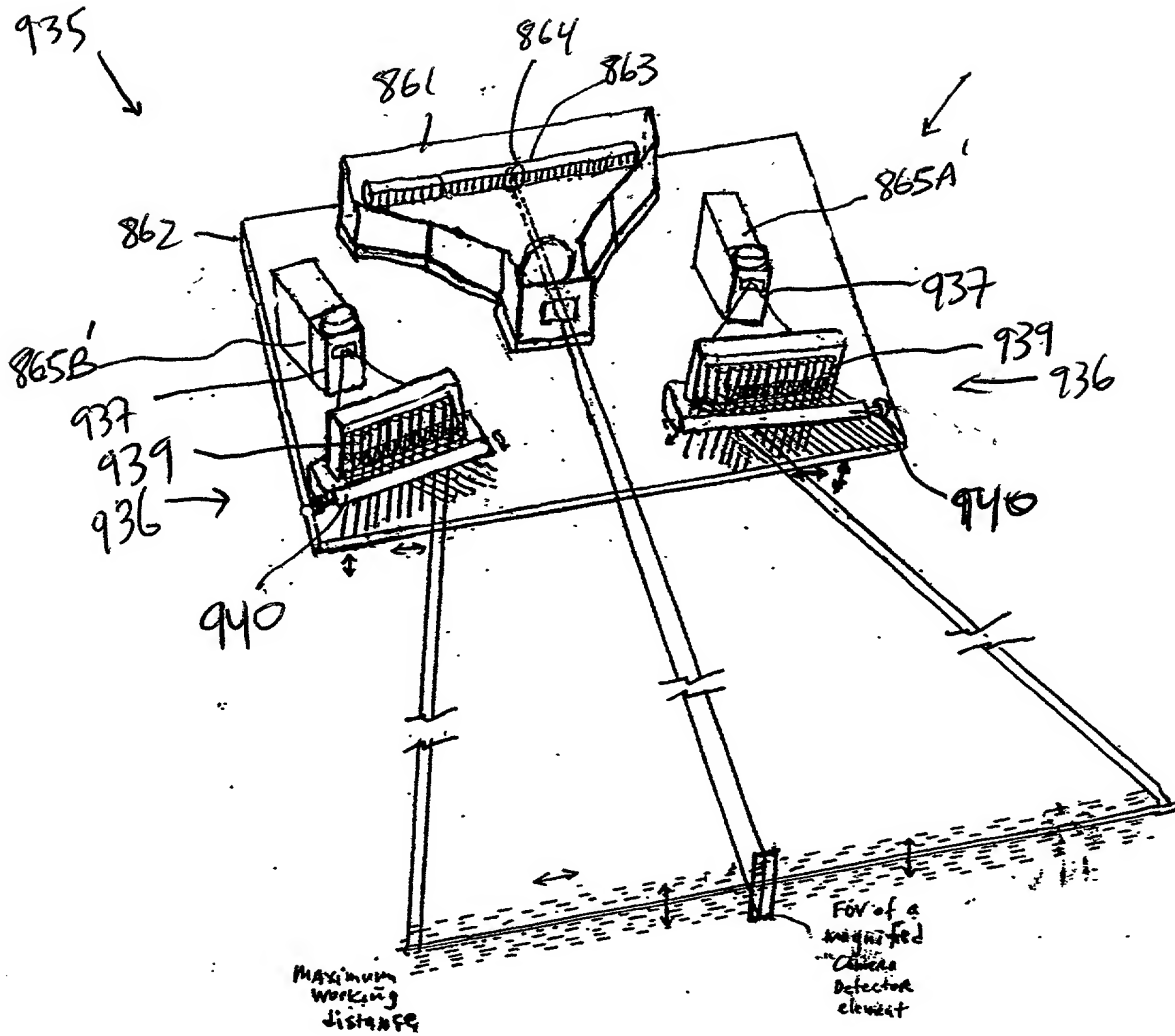


FIG. 1I25 H1

\* Lateral and Transverse Microoscillation of PLIB

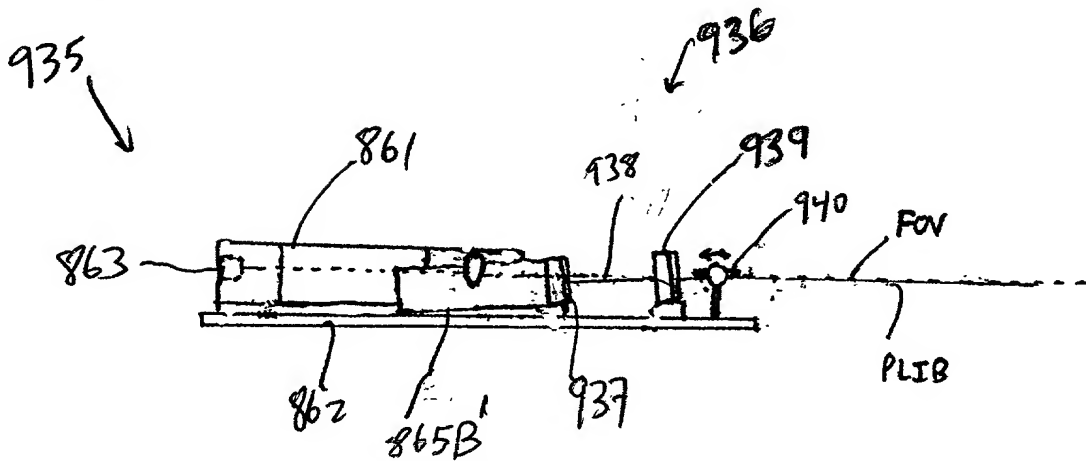
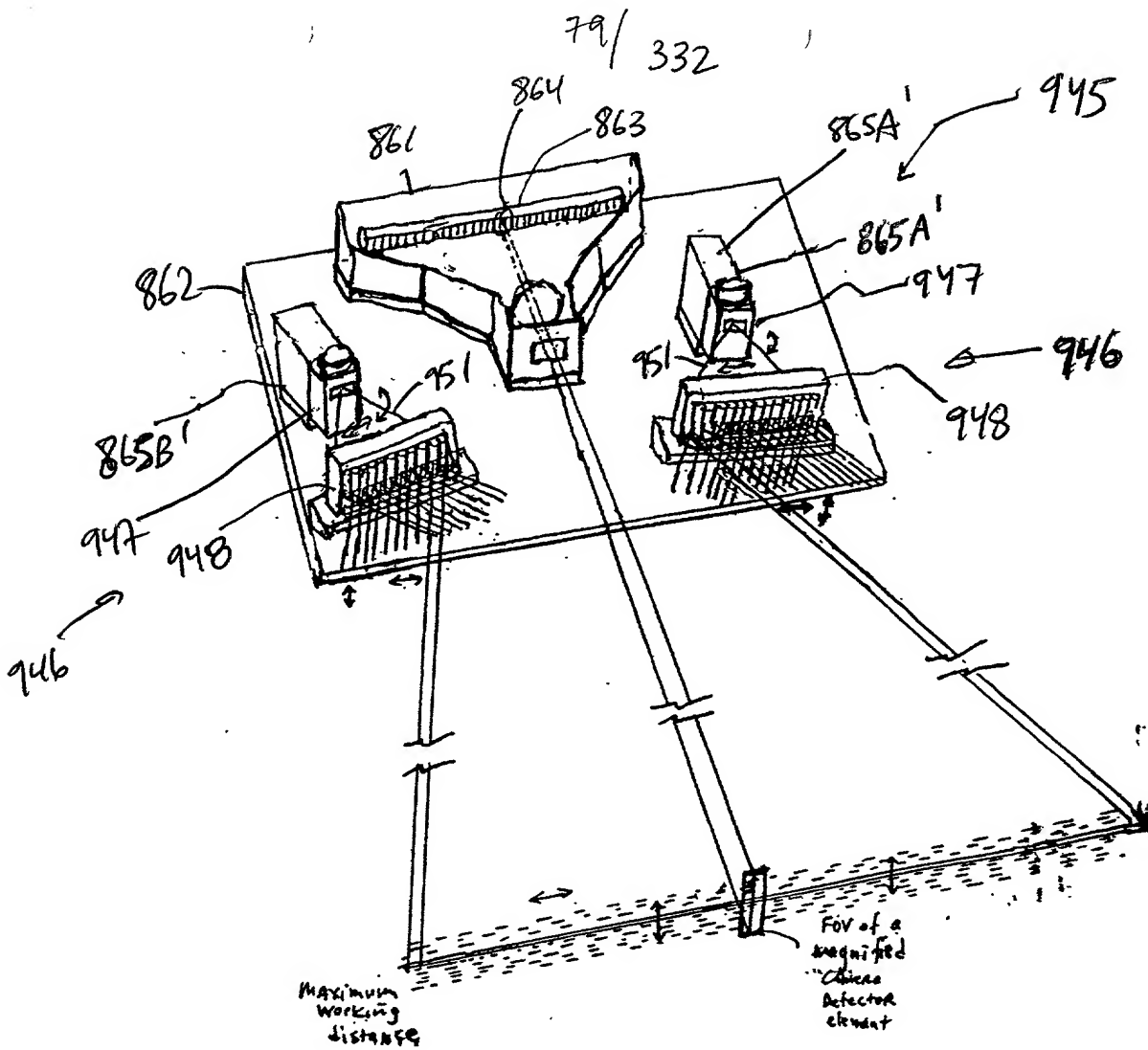


FIG. 1I25 H2



Lateral and Transverse Microoscillation of PLIB

FIG. 1I25I1

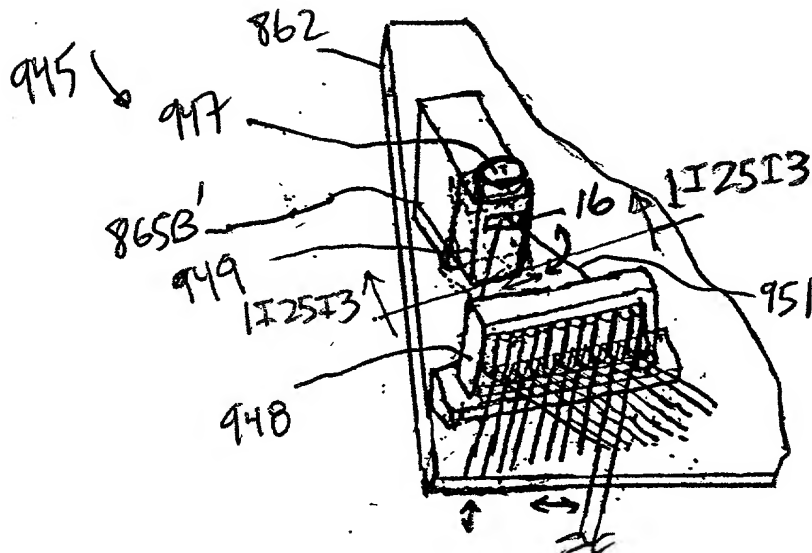


FIG. 1I25I2

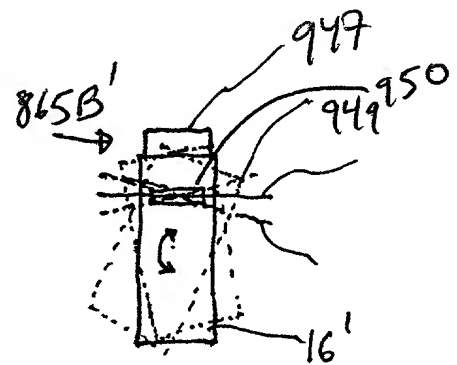


FIG. 1I25I3

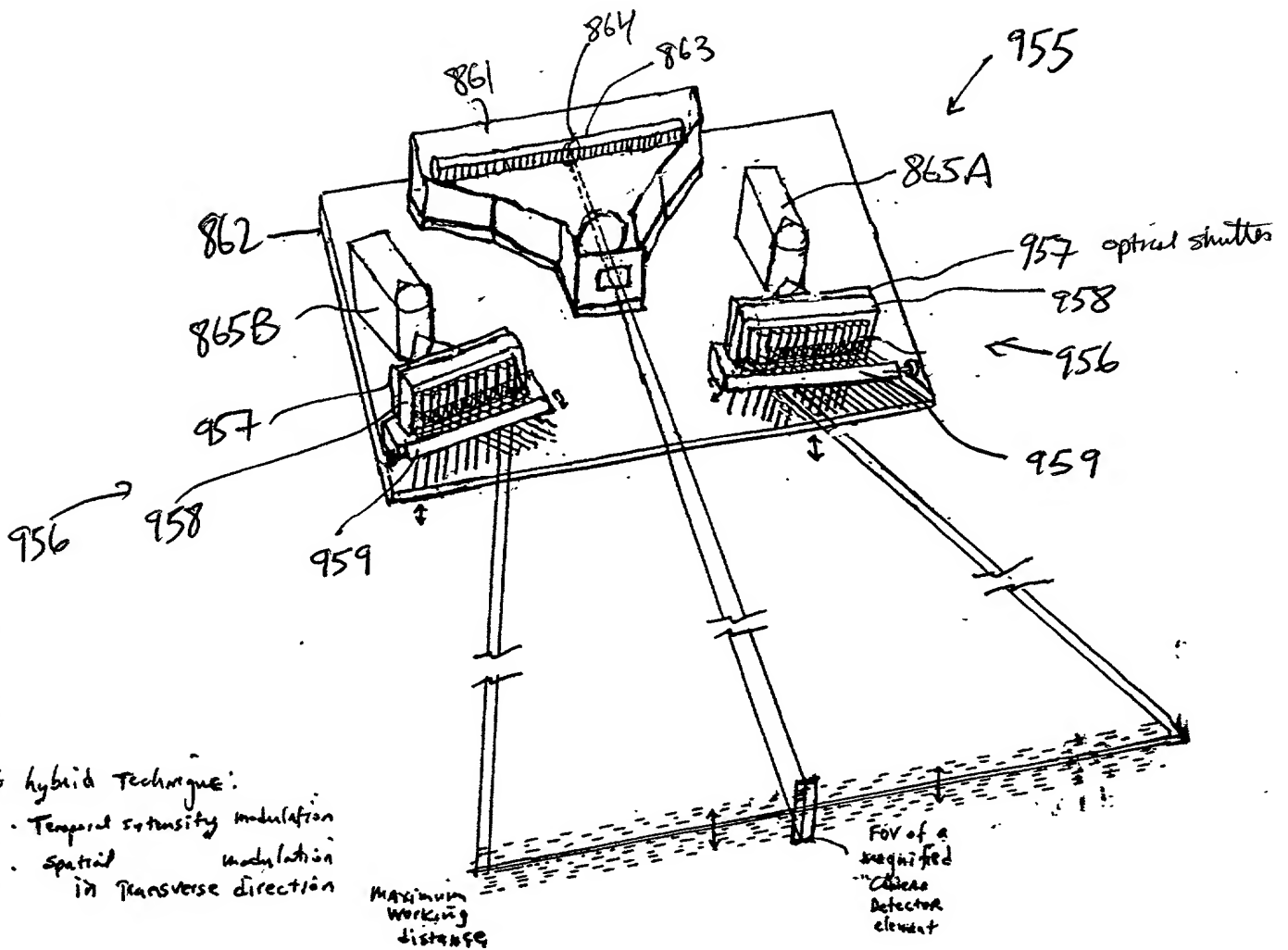


FIG. 1I25J1

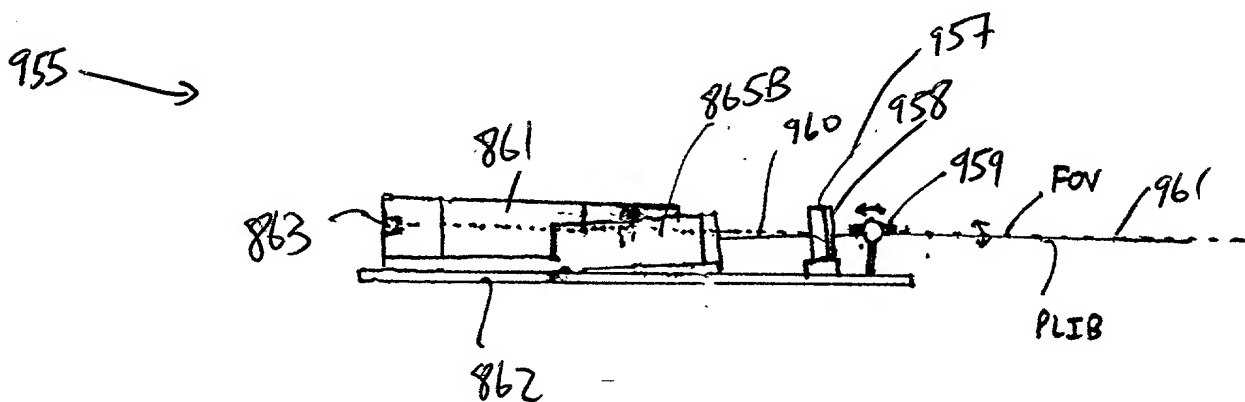


FIG. 1I25J2

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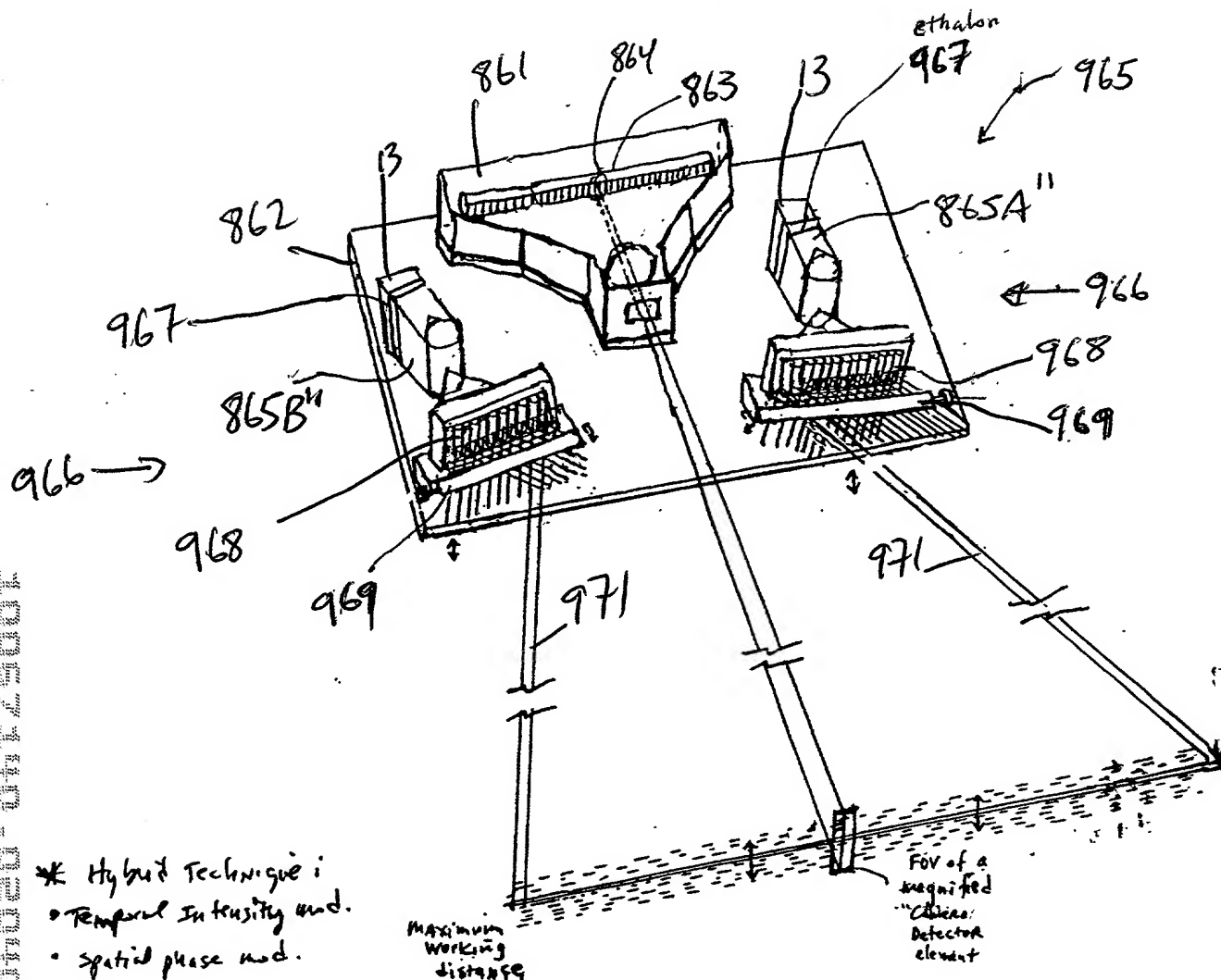


FIG. 1I25K1

\* Transverse Microoscillation of PLIB

965

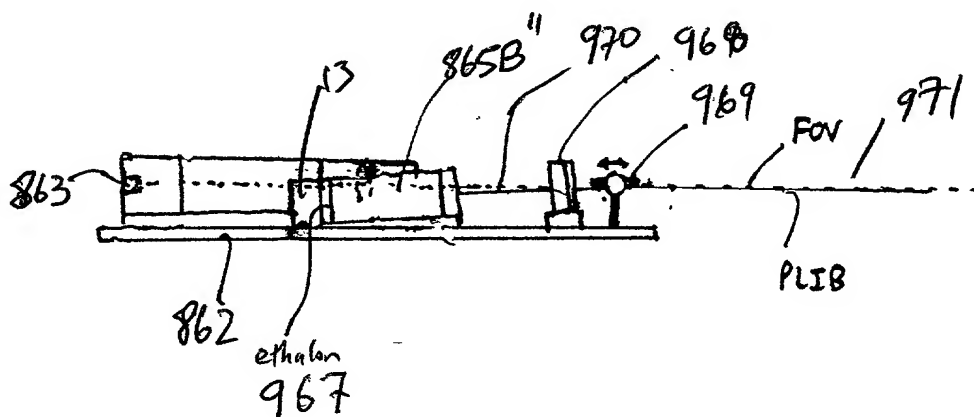
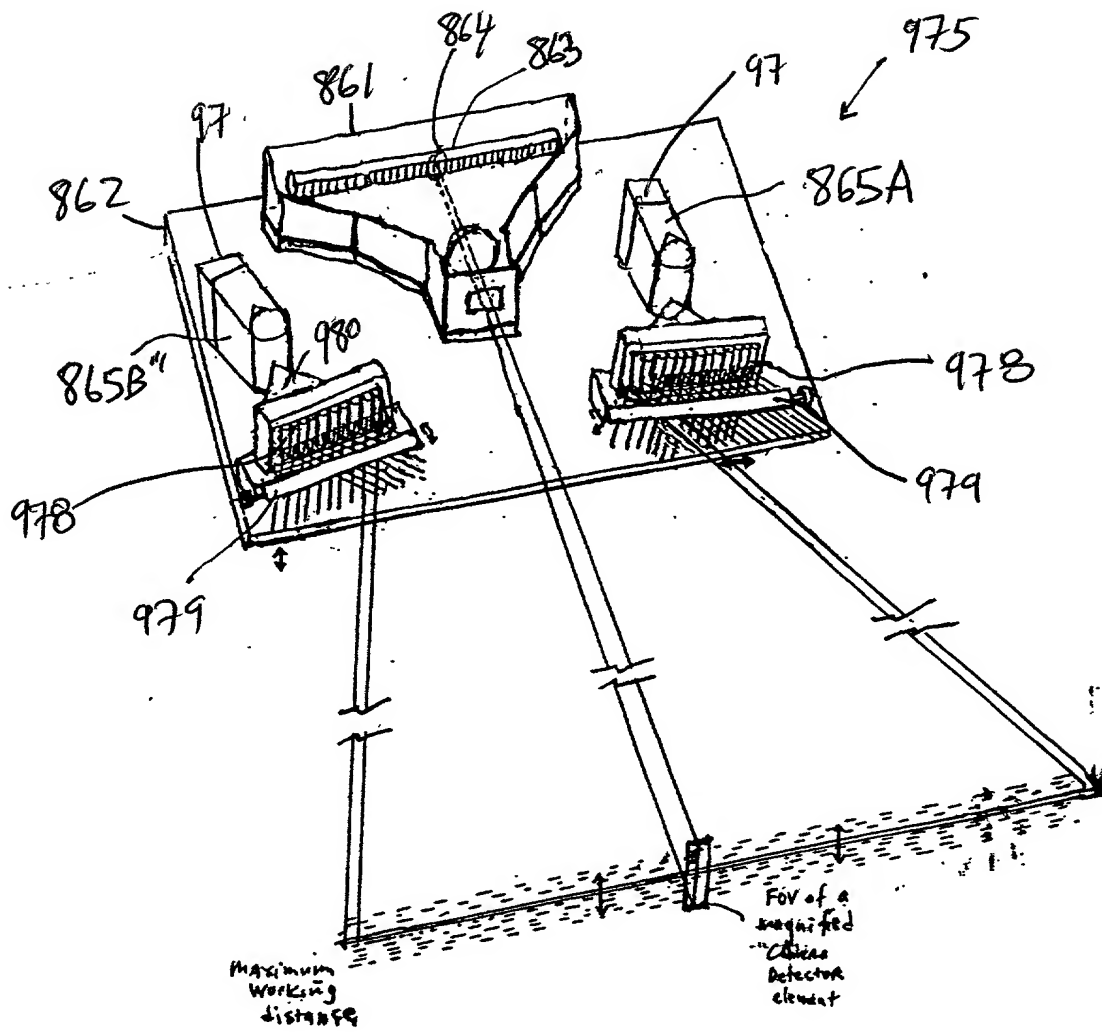


FIG. 1I25K2



\* hybrid =  
 • Temp. freq. mod.  
 • spatial phase mod.  
 \*  
 Transverse  
 Microoscillation of PLIB

FIG. 1I25L1

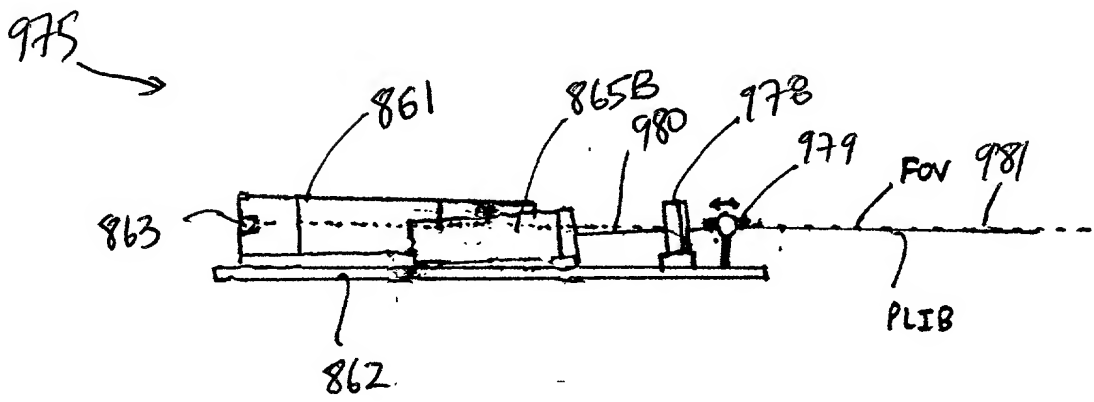
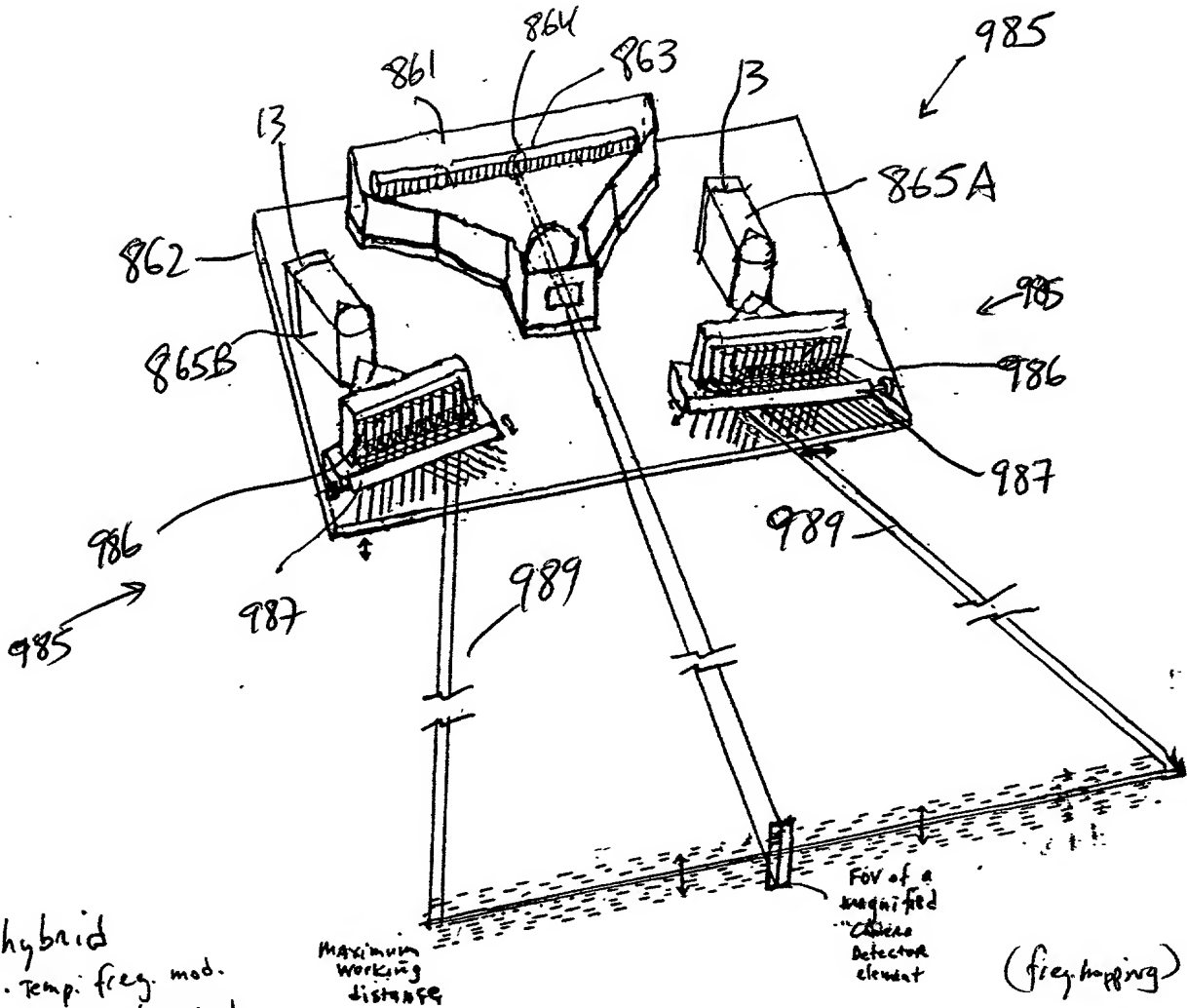


FIG. 1I25L2

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\* hybrid  
 • Temp. freq. mod.  
 • Spatial phase mod.

\* Transverse  
 Microoscillation of PLIB

FIG. 1I25M1

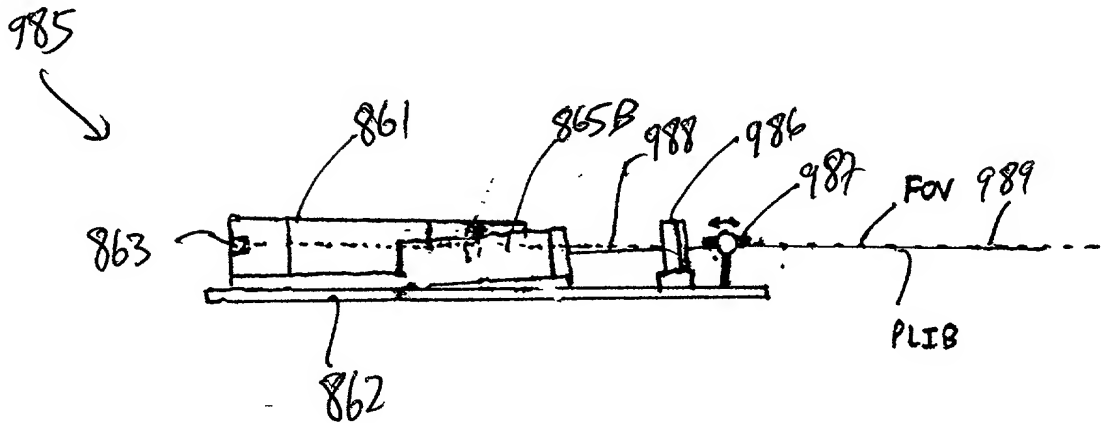


FIG. 1I25M2

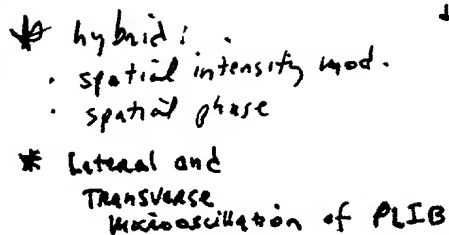


FIG. 1125N1





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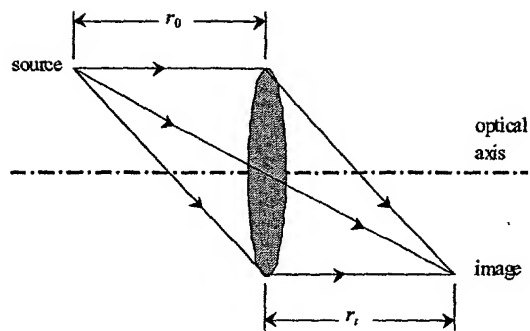


FIG. 1H1

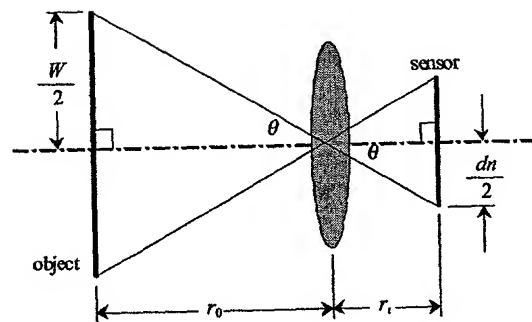


FIG. 1H2

2024-04-20 10:44:00

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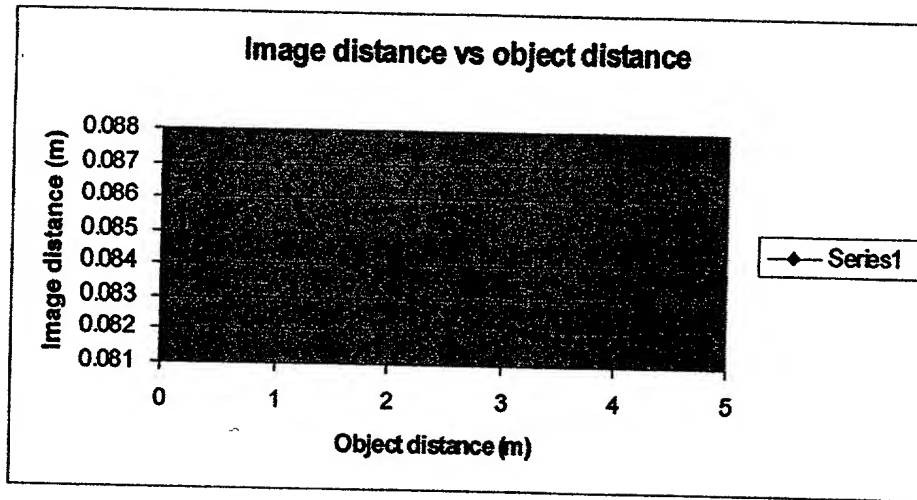


FIG. 1H3

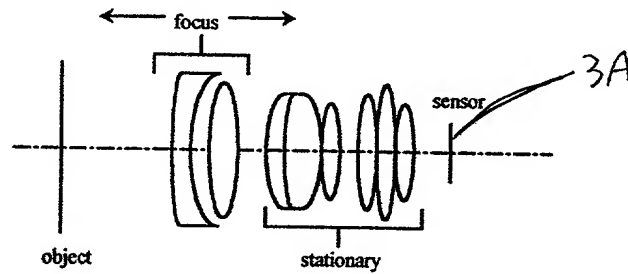


FIG. 1H4

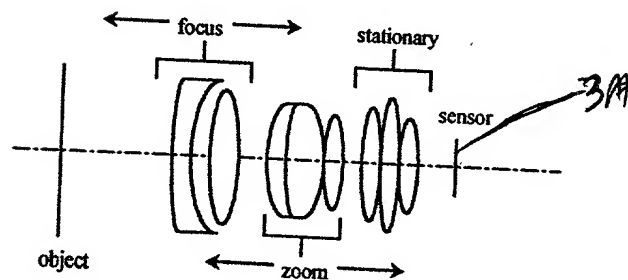


FIG. 1H5

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Fixed focal length lens cases

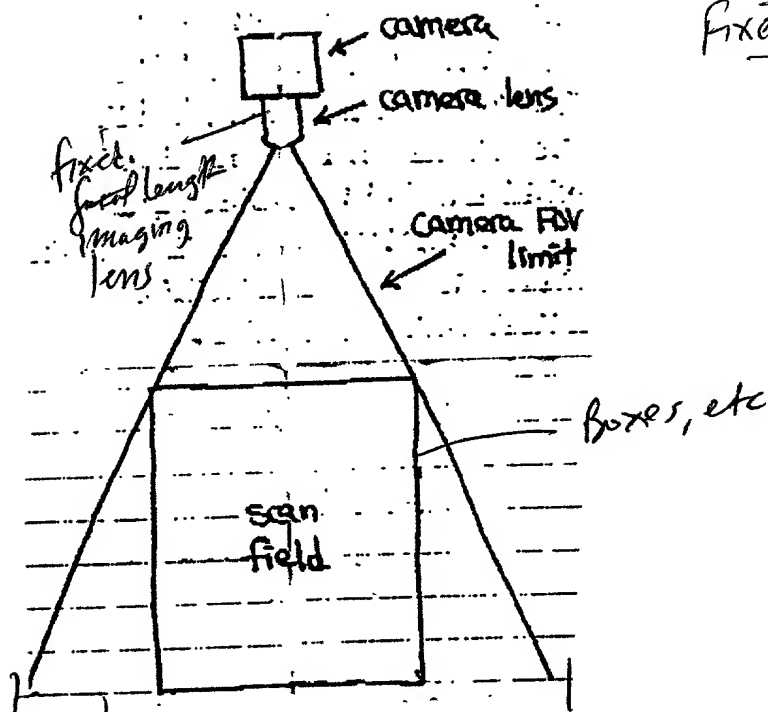


FIG. 1K1

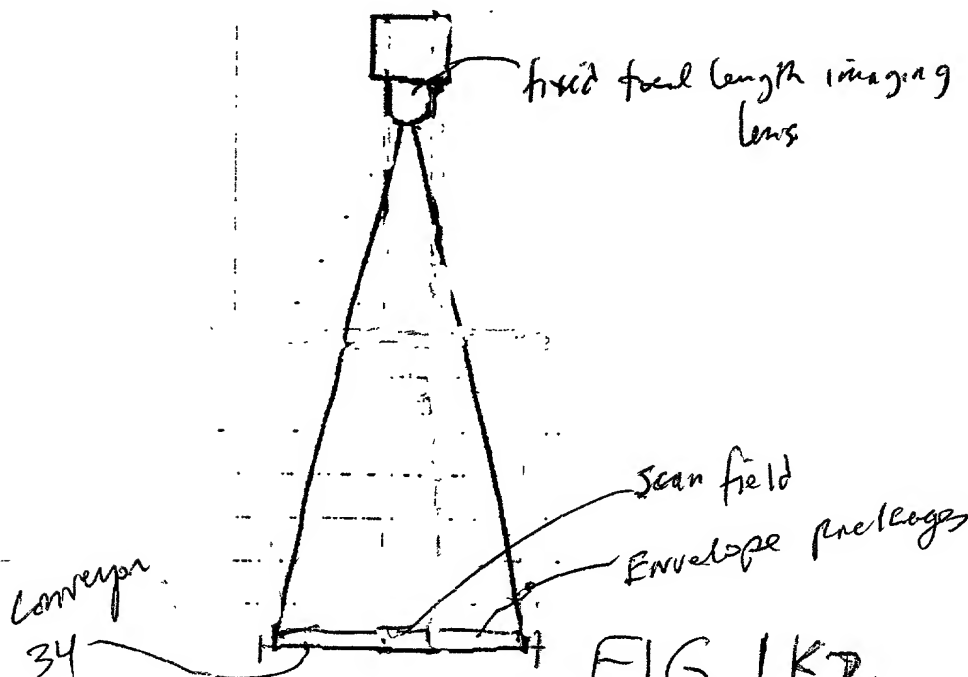
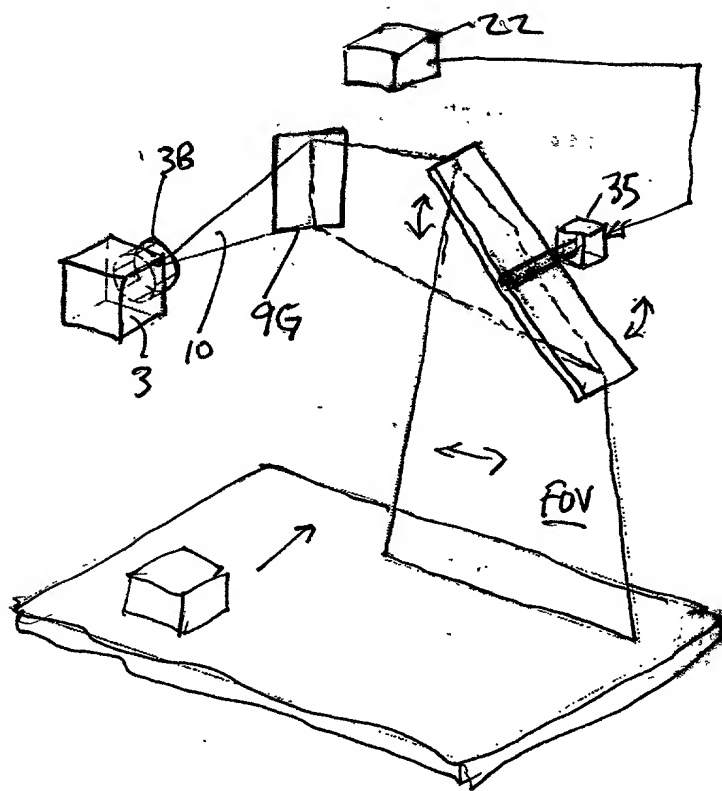
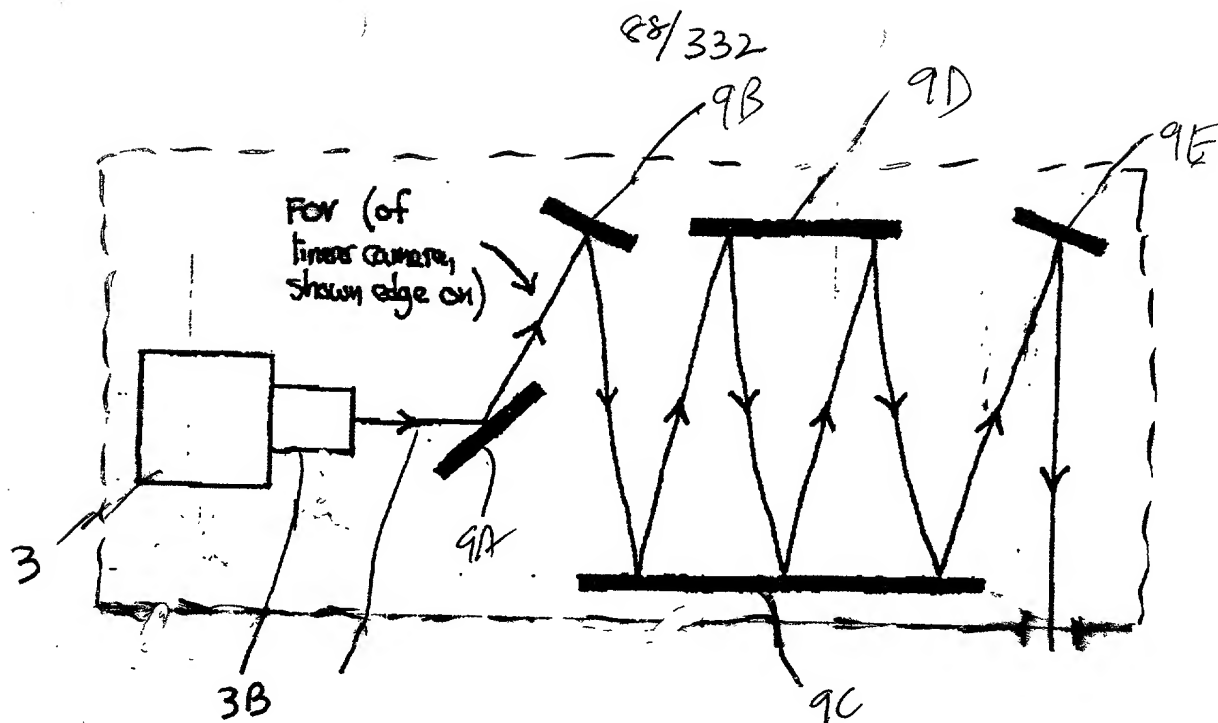


FIG. 1K2



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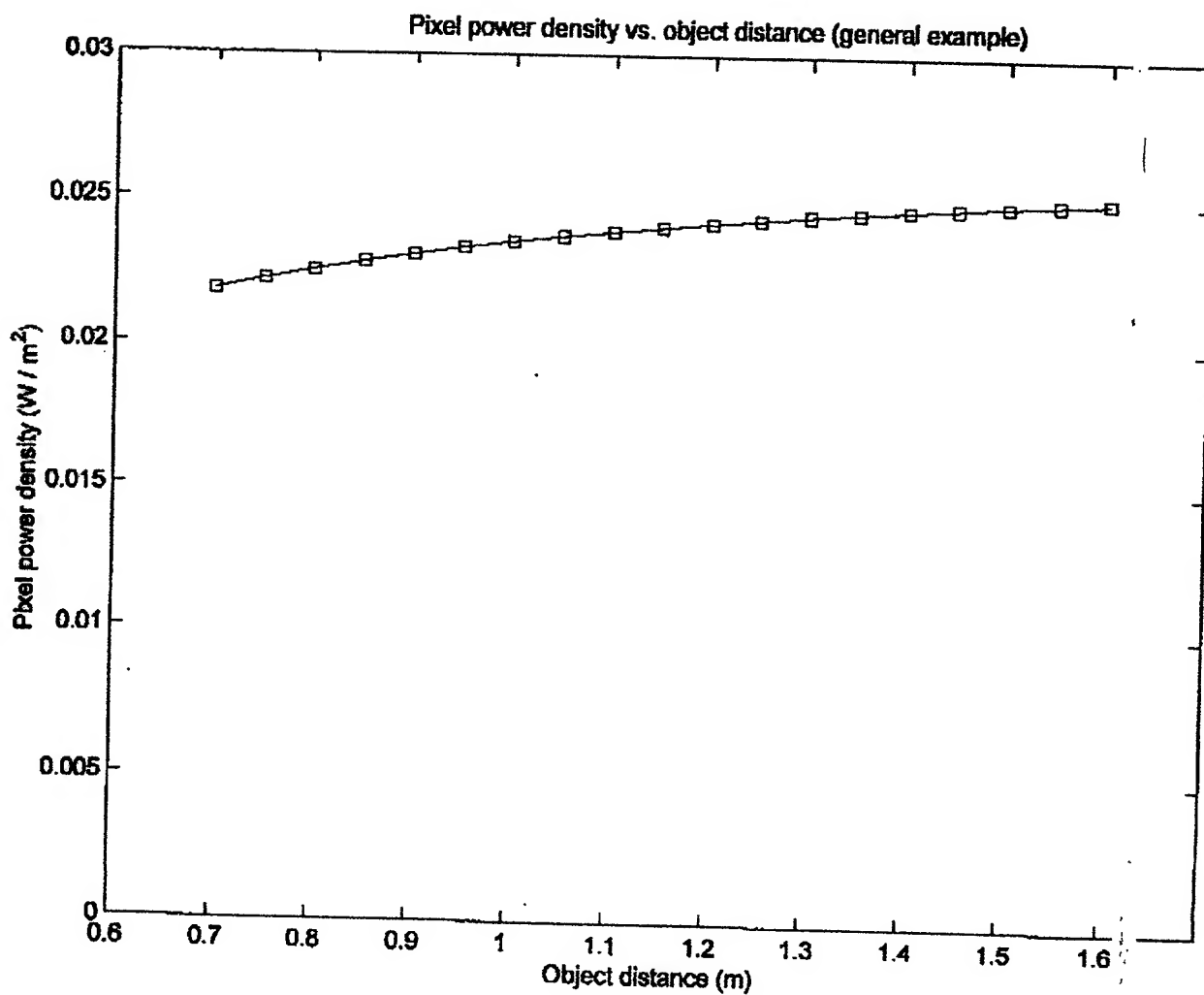


FIG-1M1

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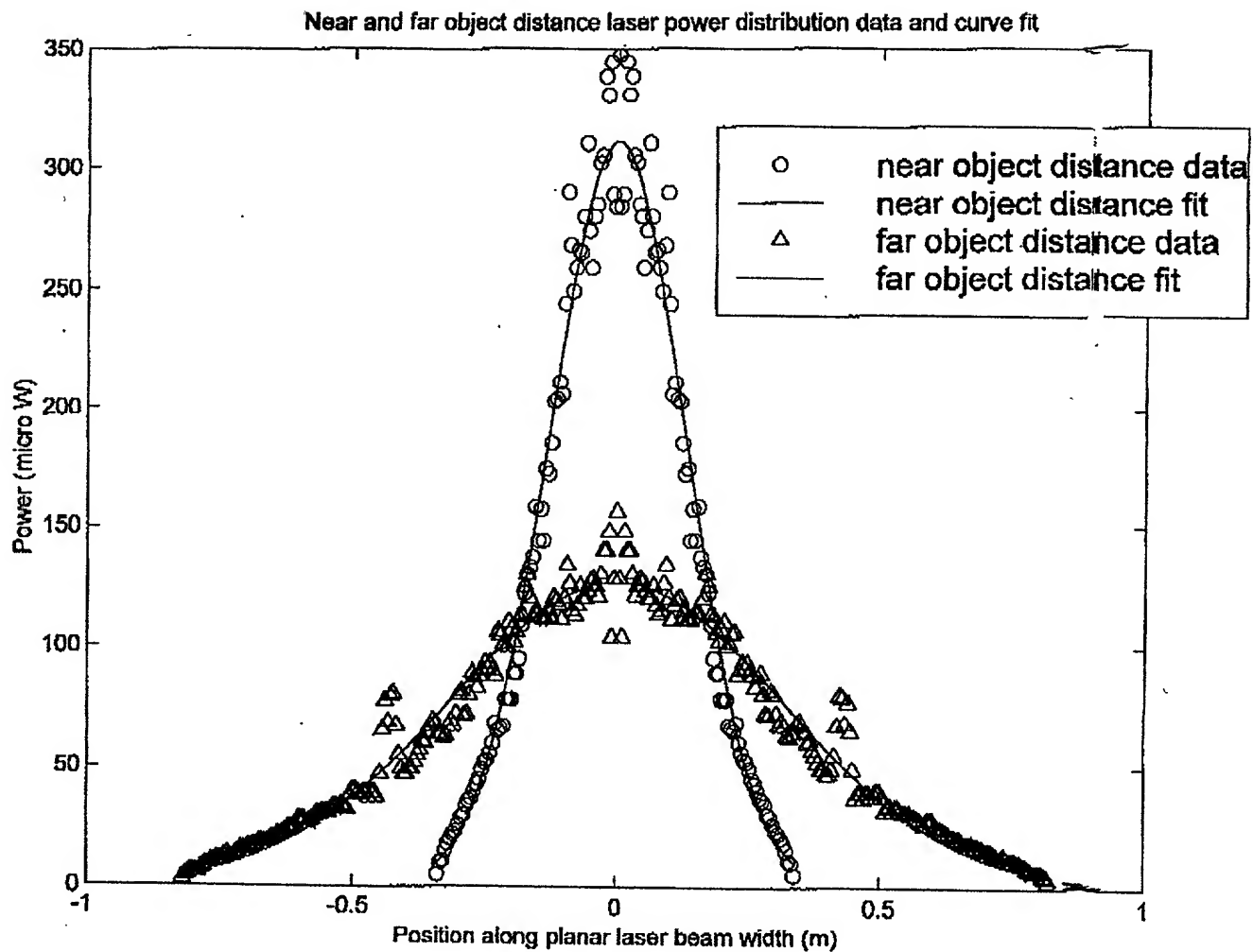


FIG. 1M2

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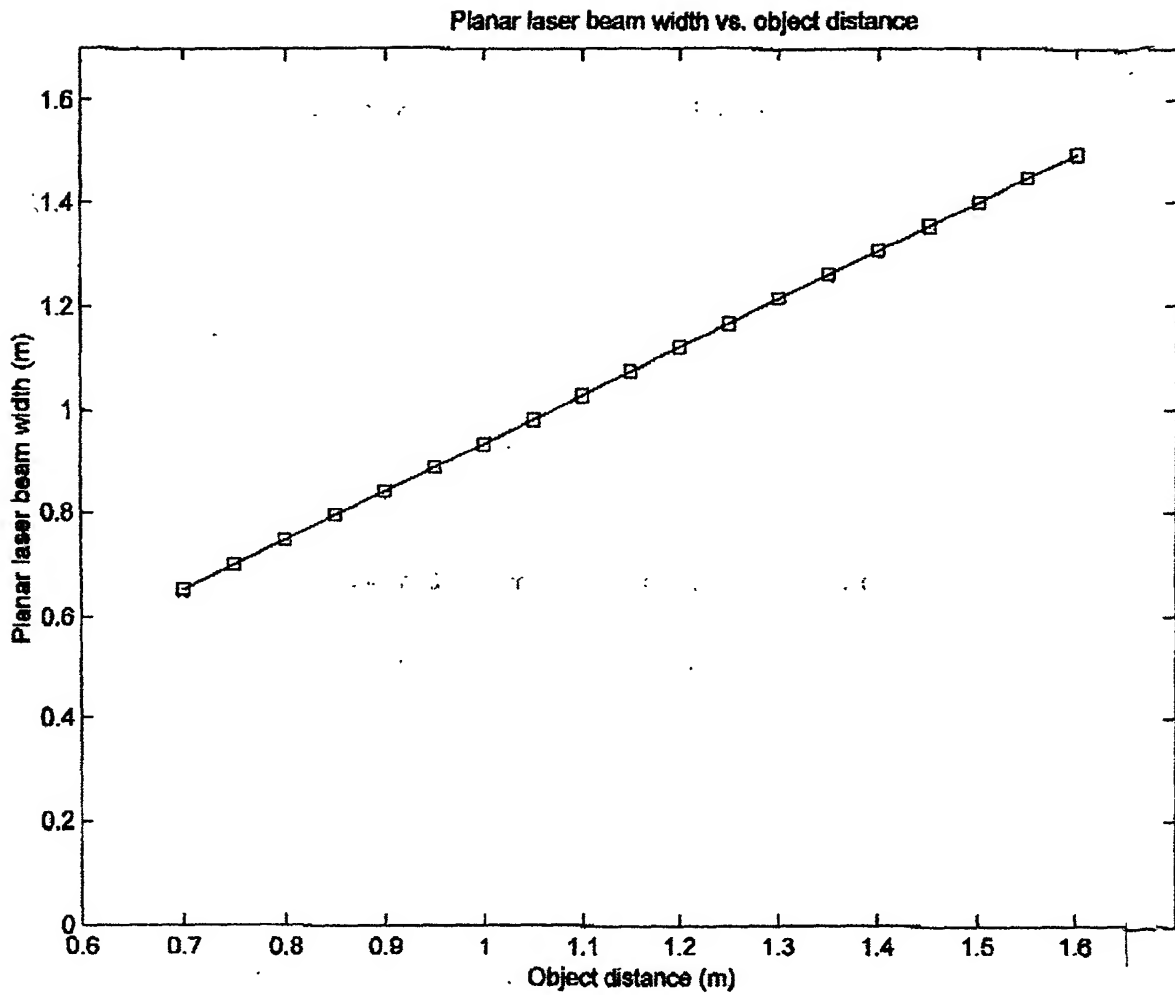
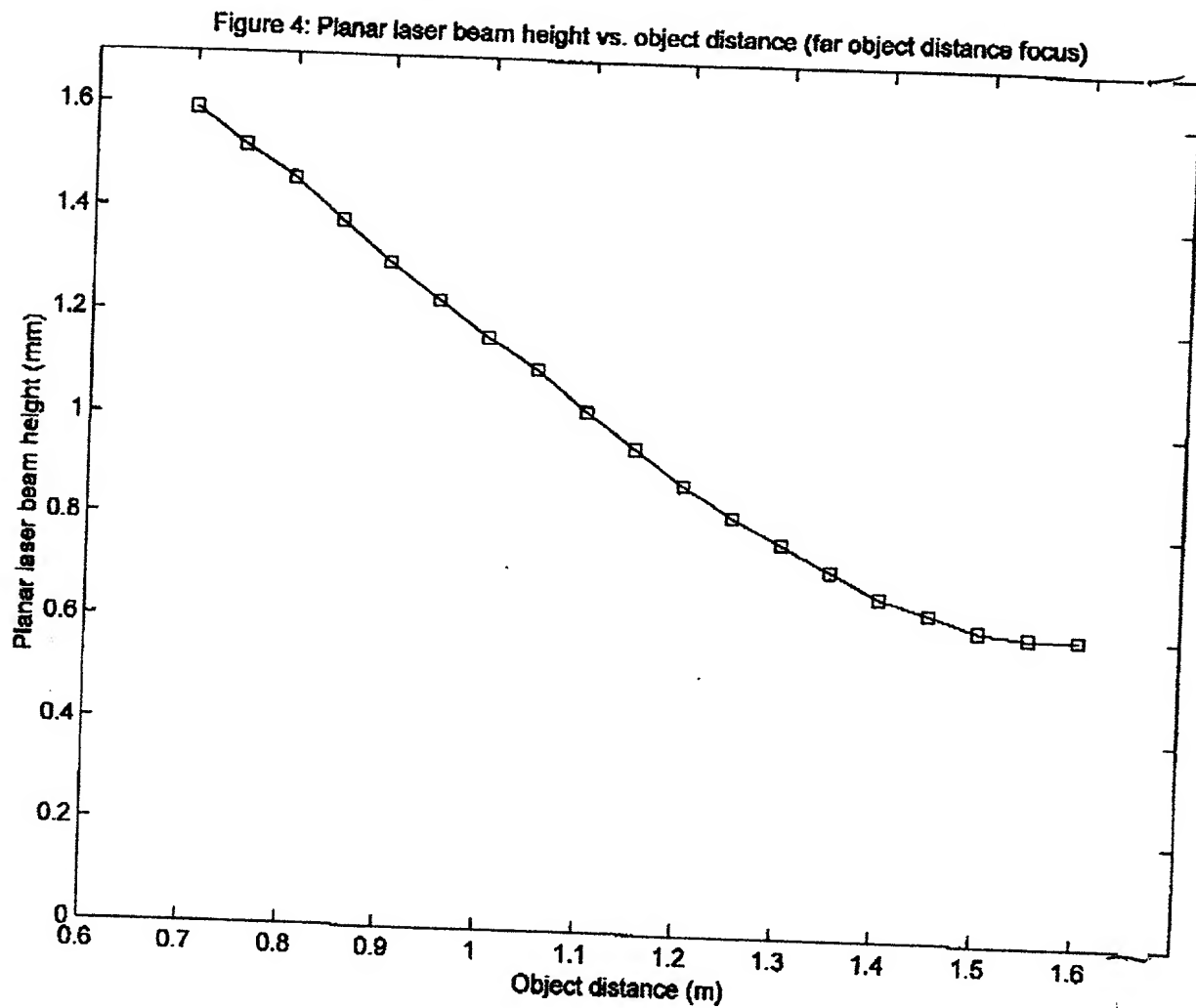


FIG. 1M3

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FIG/M4



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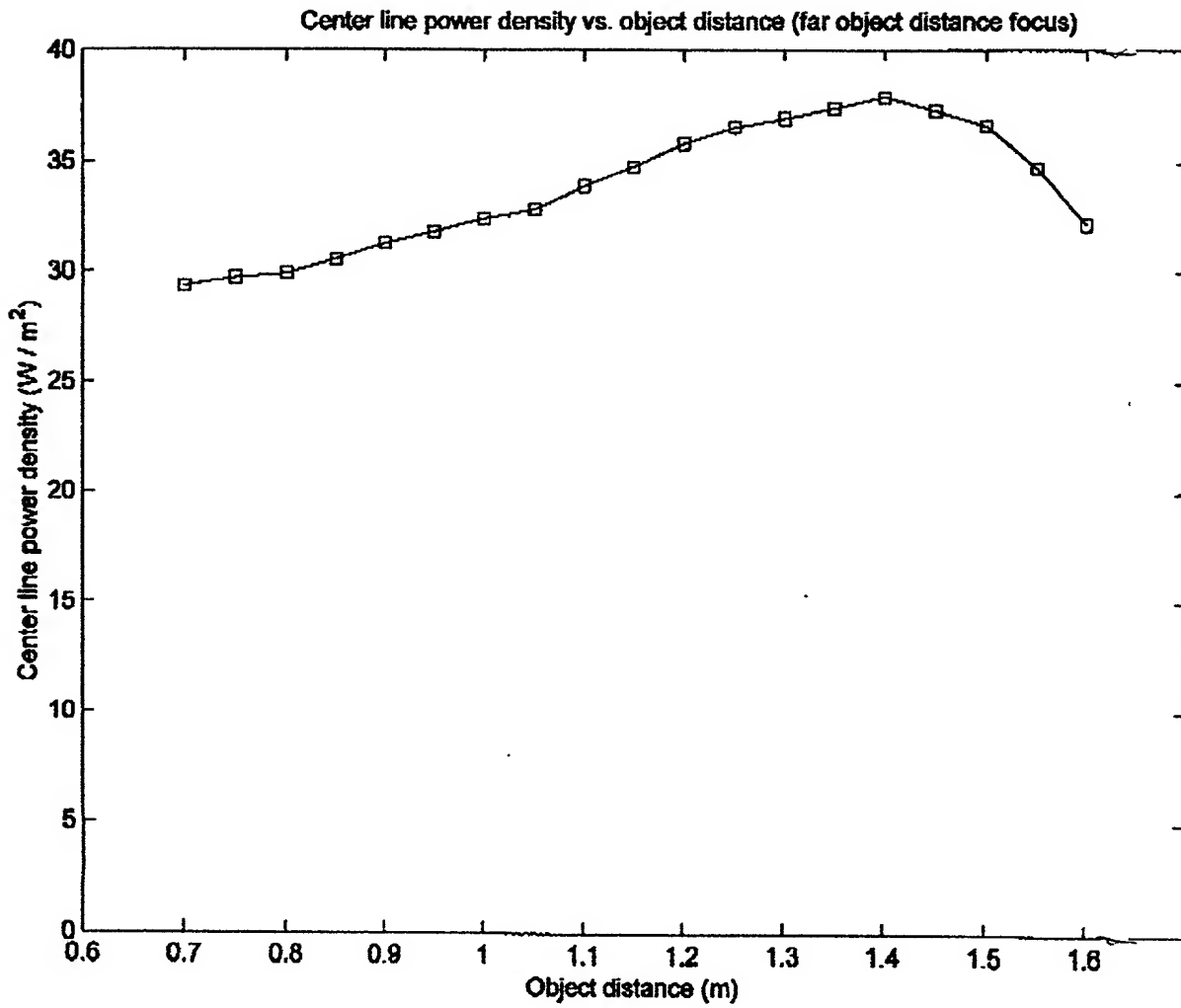


FIG. 1N

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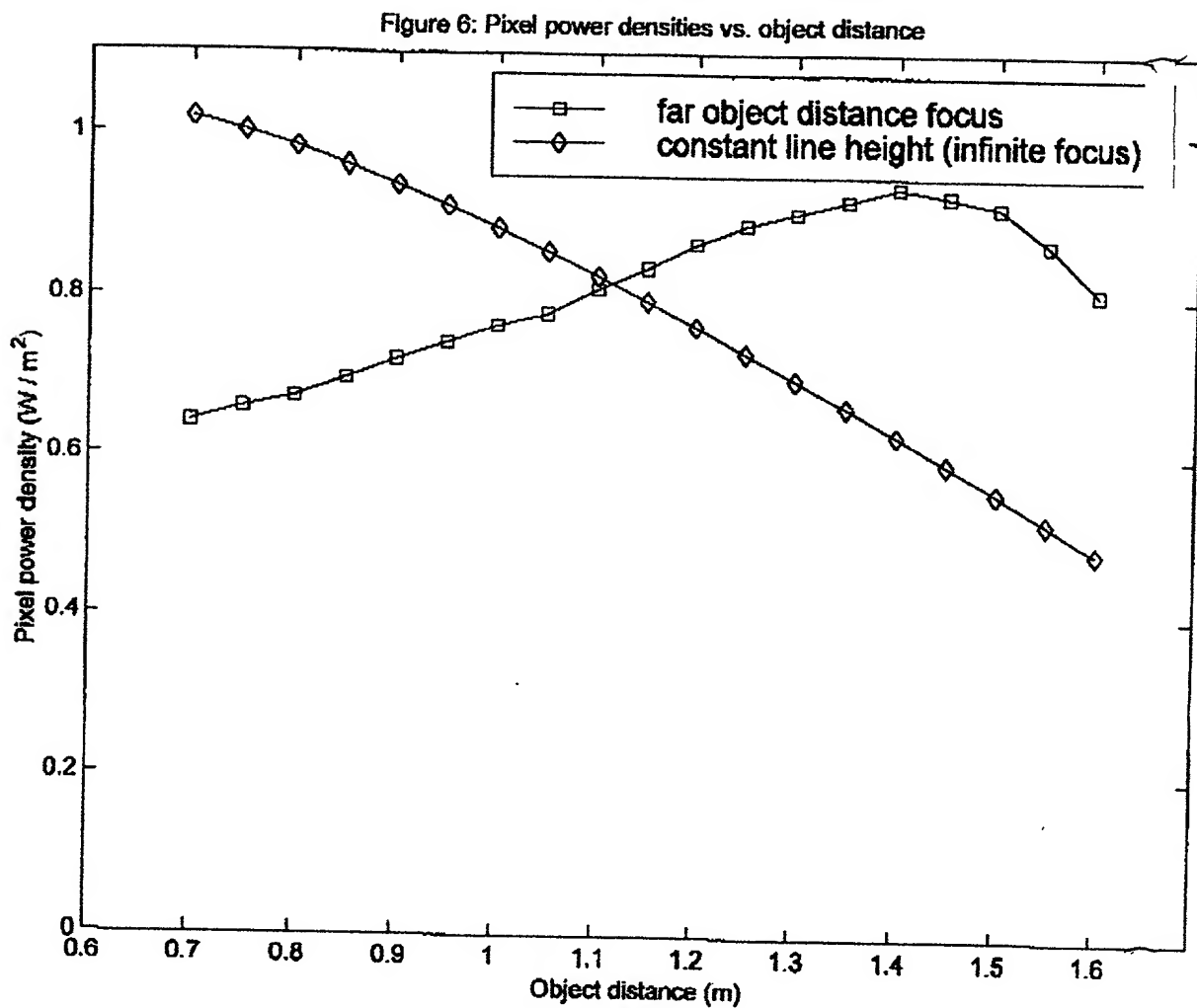


FIG. 10

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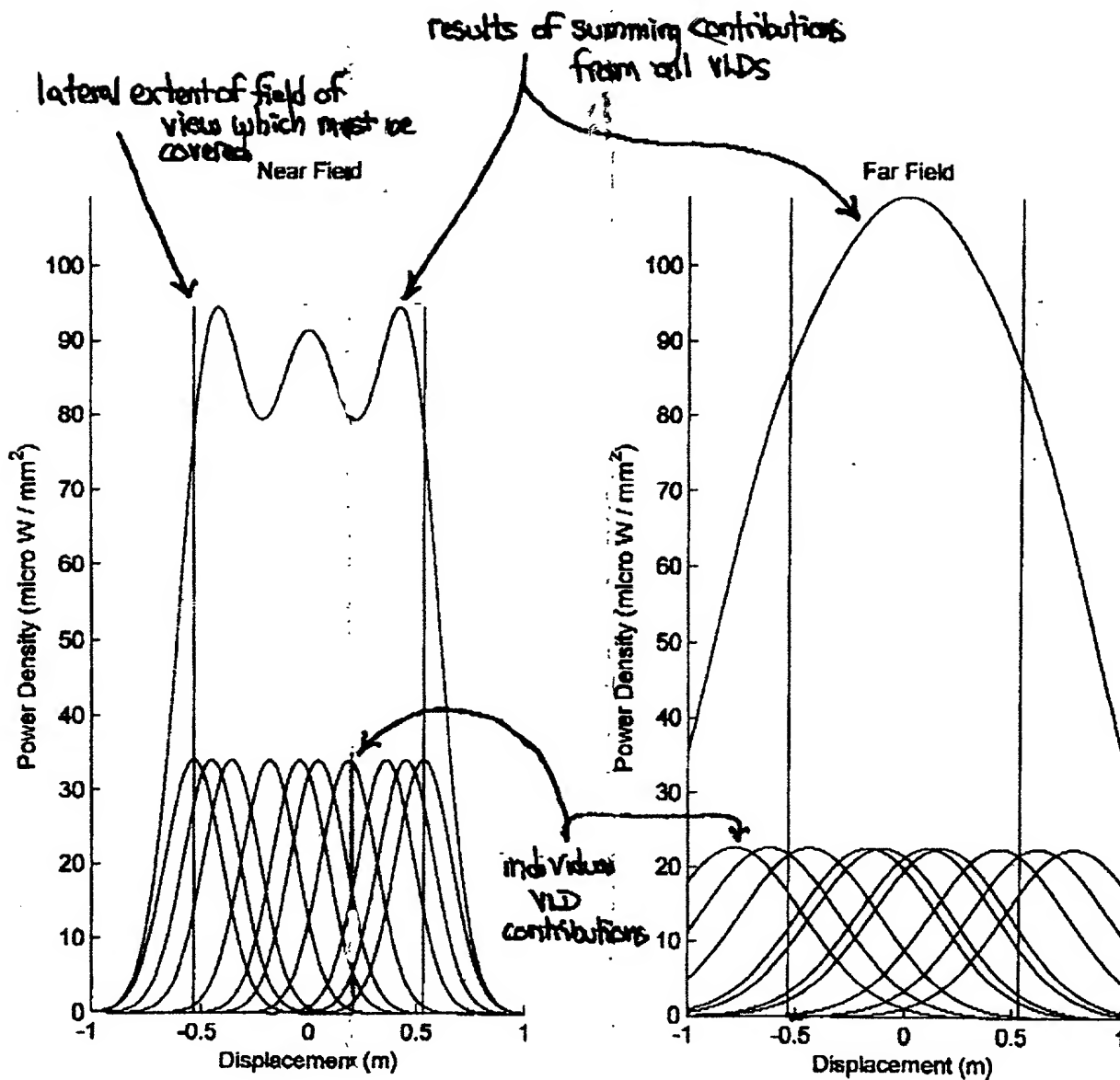


FIG 1P1

FIG 1P2

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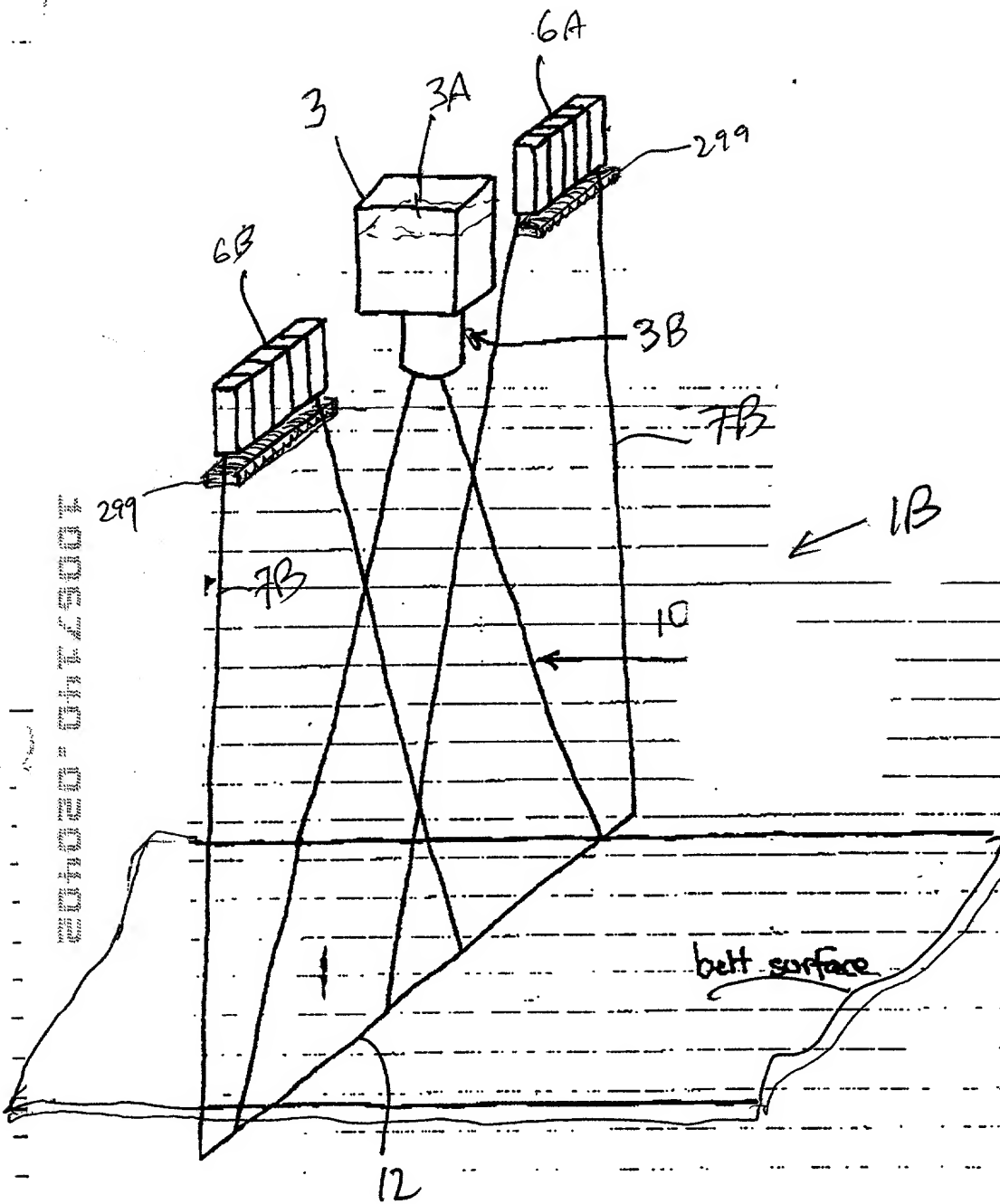


FIG. 1Q1

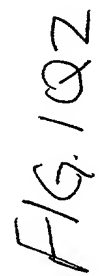
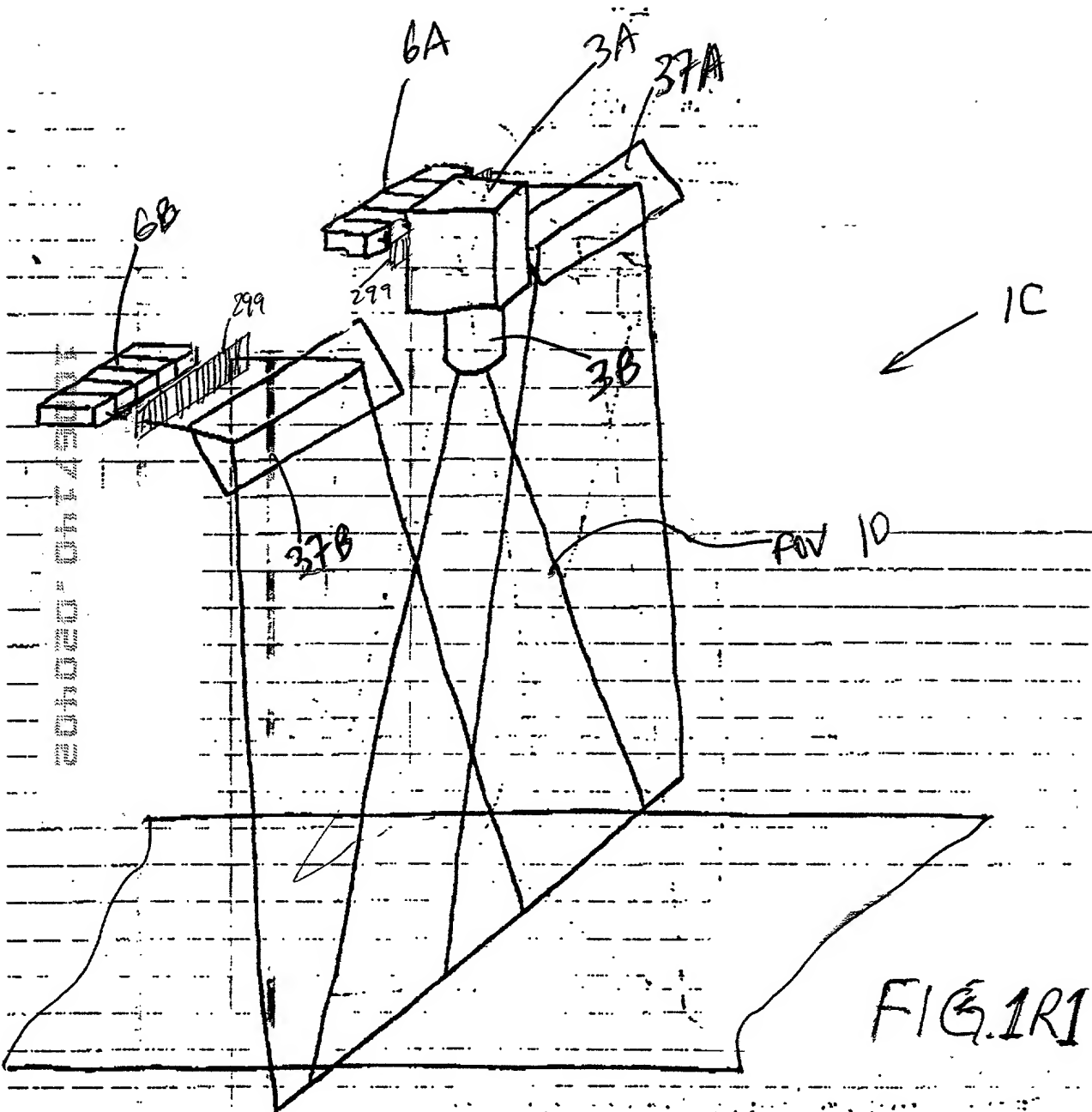
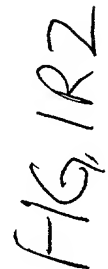


FIG. 102

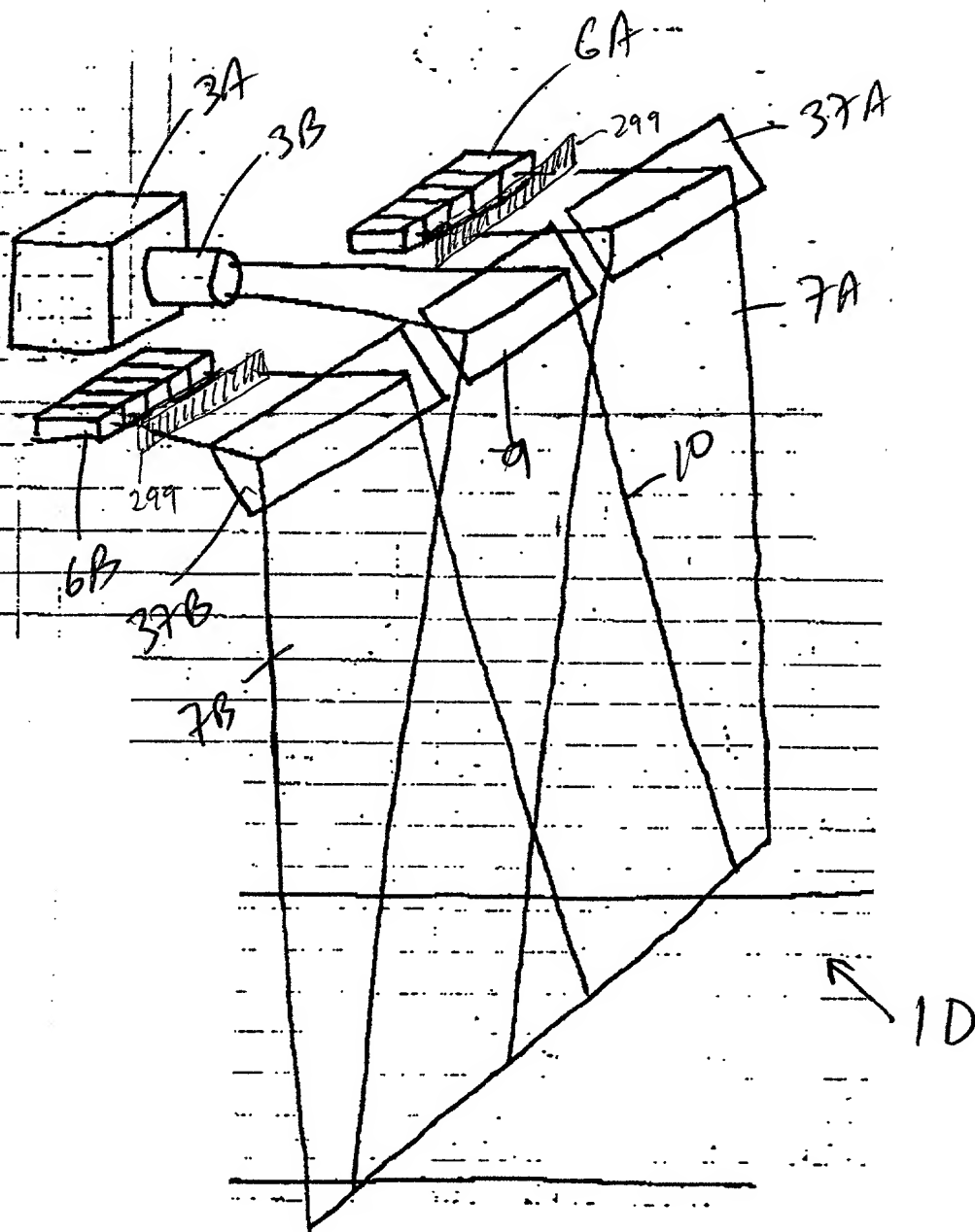
98/332



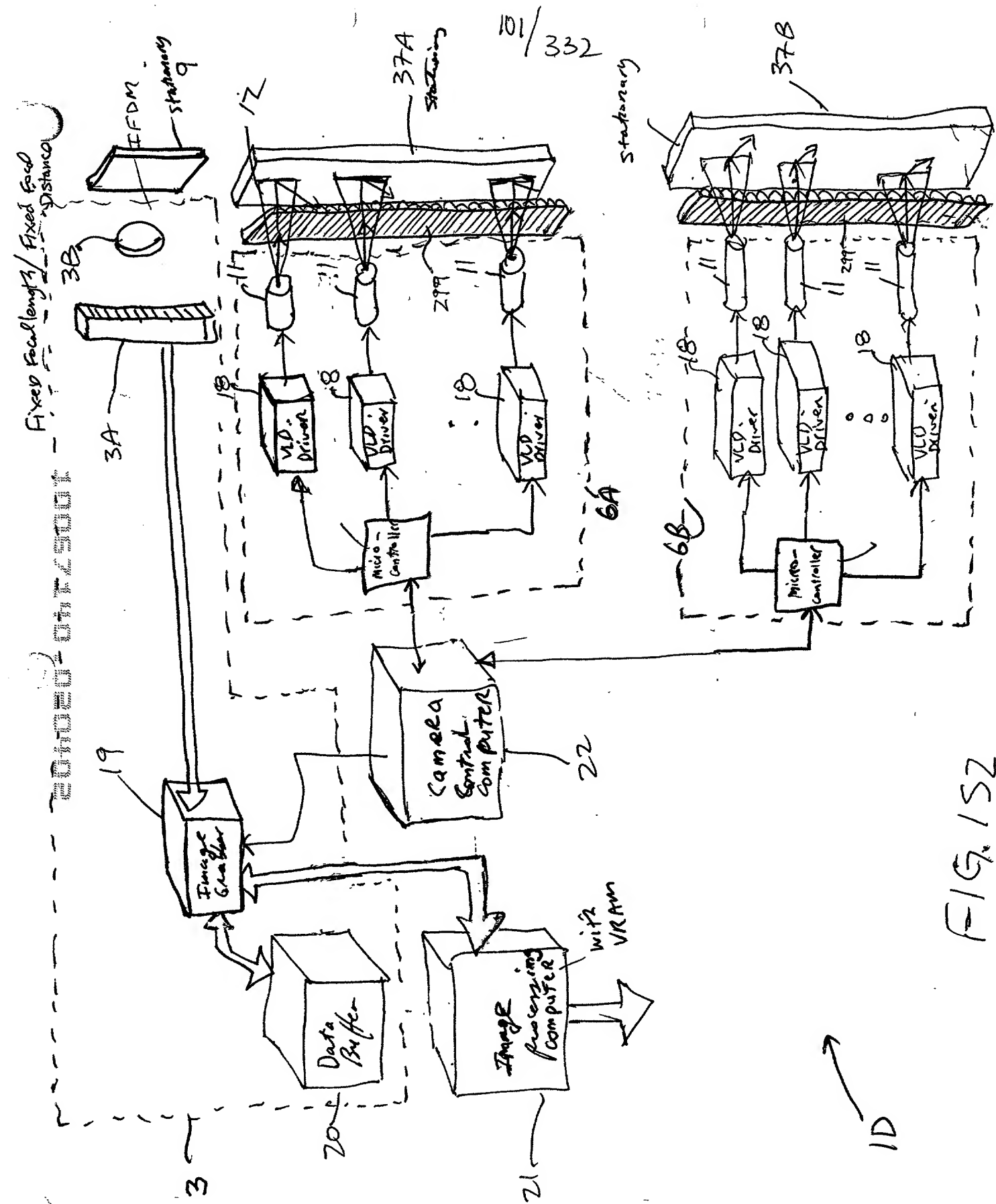
378  
Stationary



12







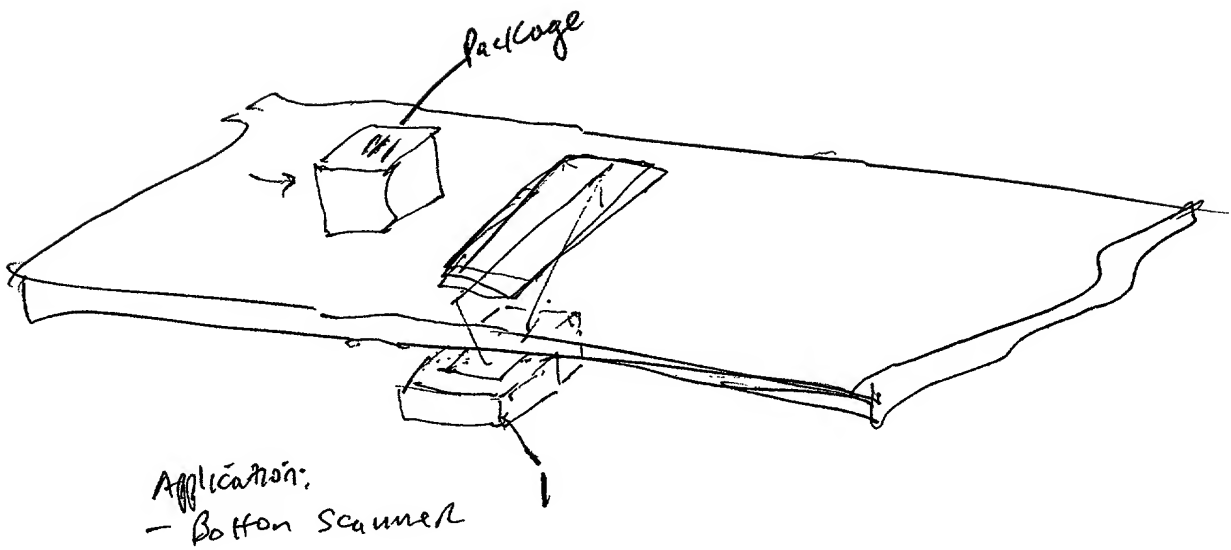
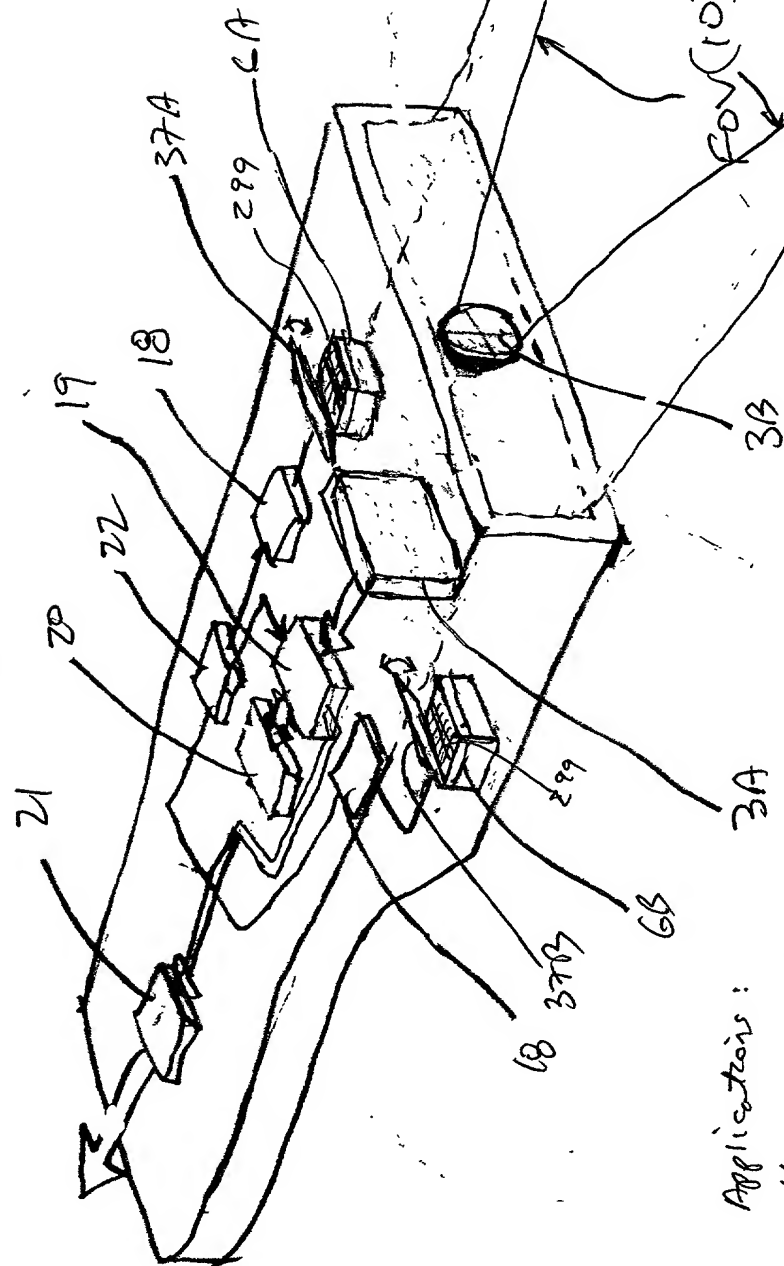


FIG 1T

1C



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Plane of  
Laser  
Illumination

12

FOV(10)

3A

Applications:  
• Hand-Held Scanner  
• Presentation Scanner

FIG. 1U

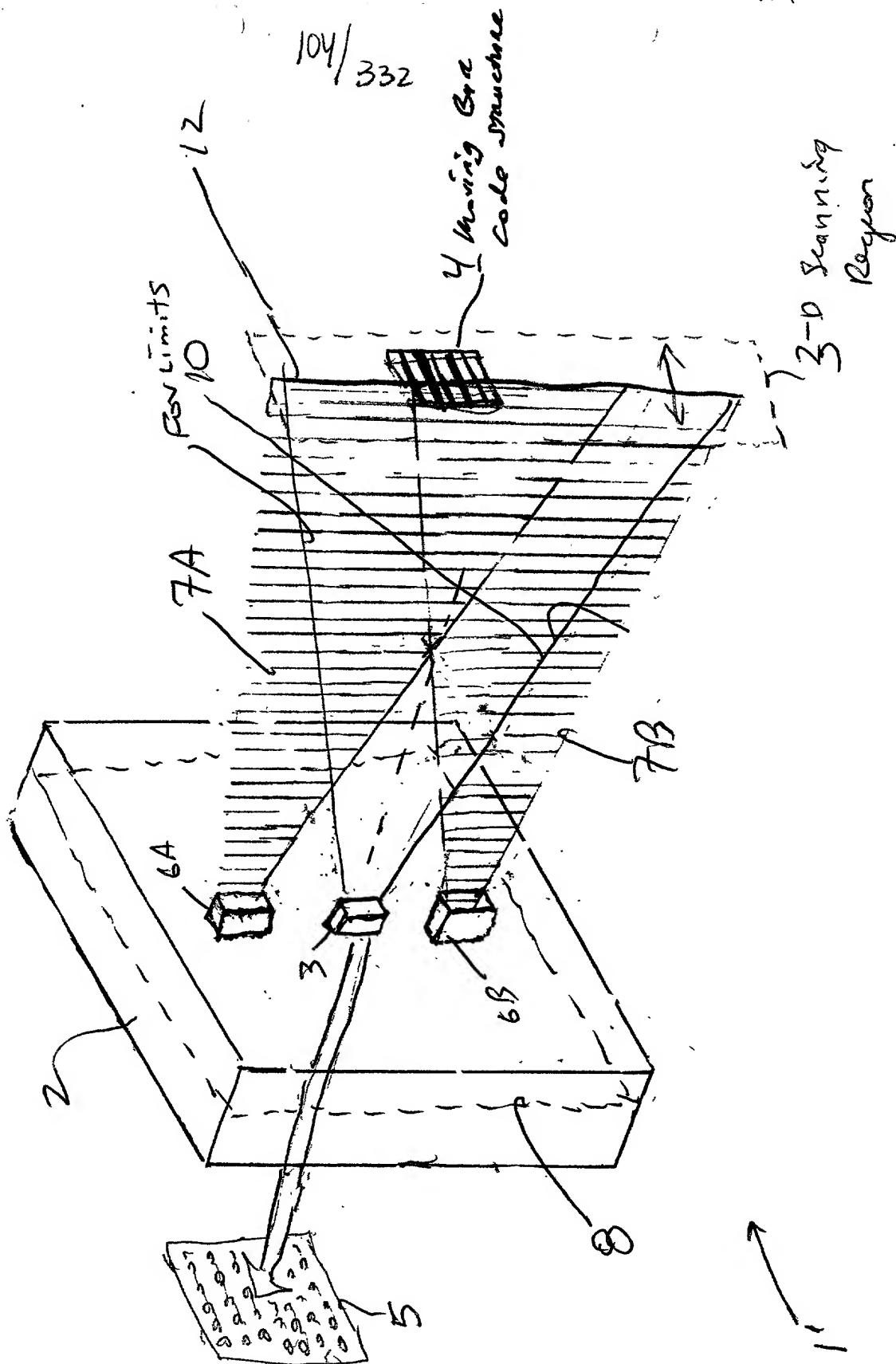


FIG. 1VI

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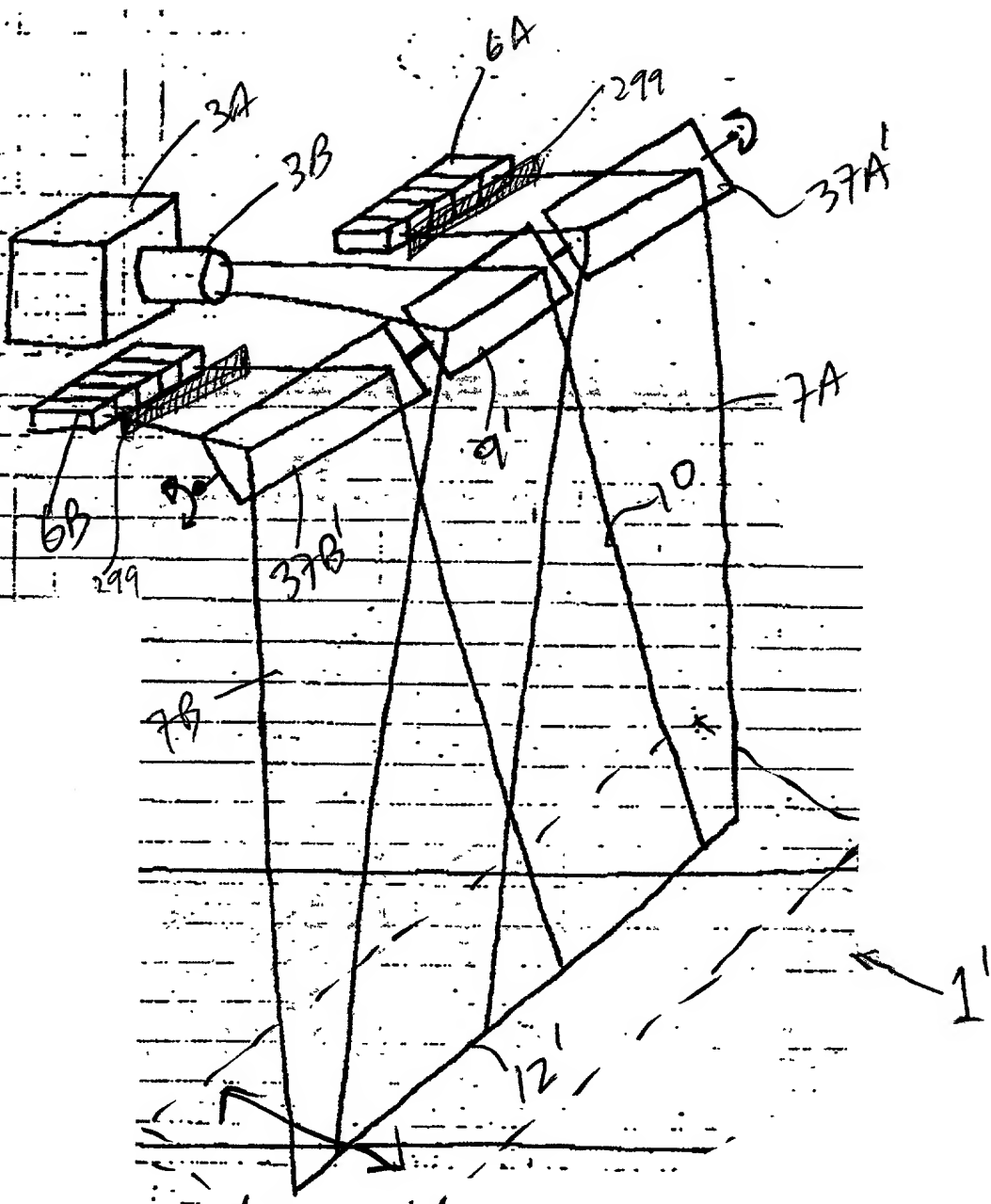


FIG. IV2

2-D  
region  
of  
space

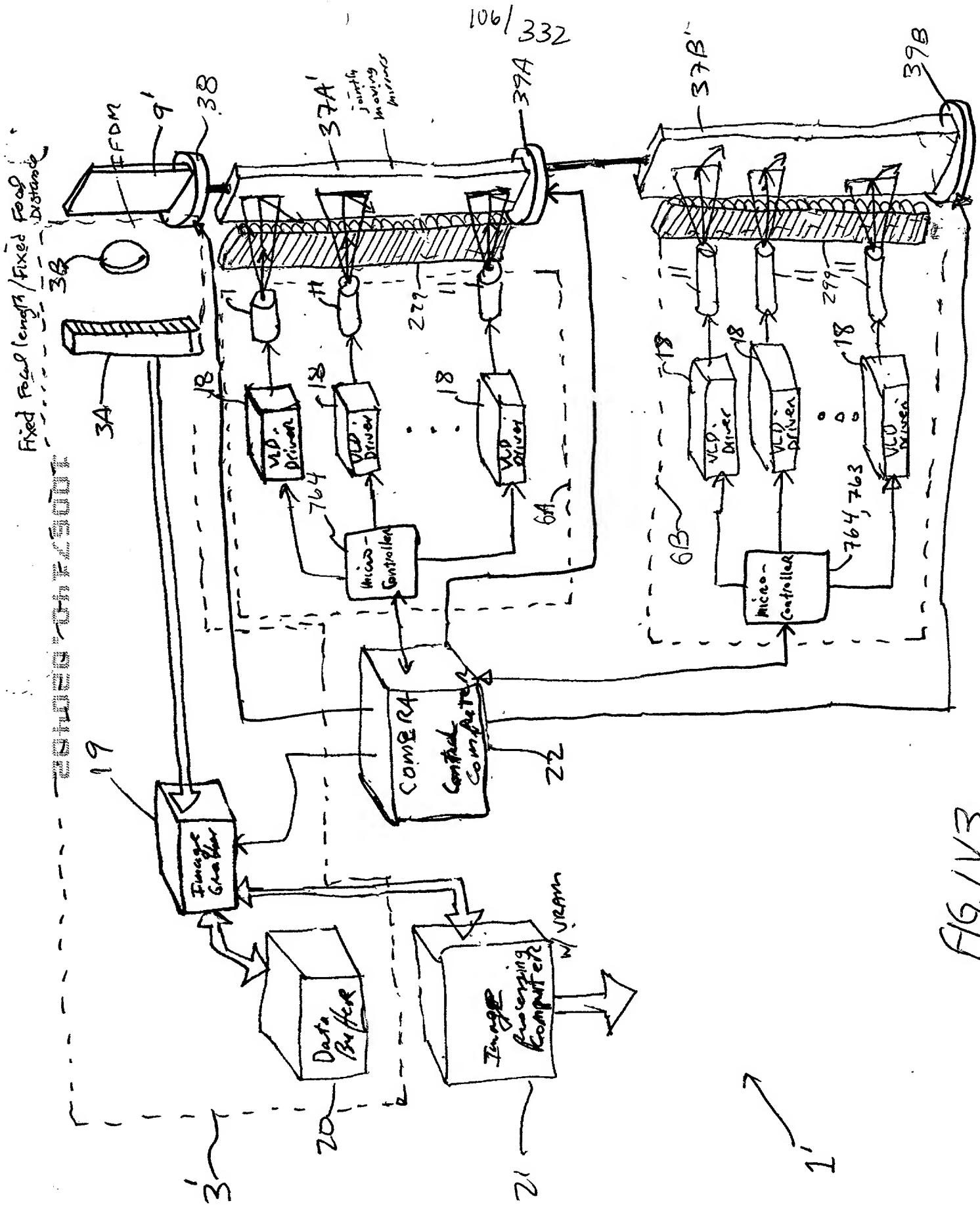


Fig. 1V3

- Hand-held Scanner
- Presentation Scanner

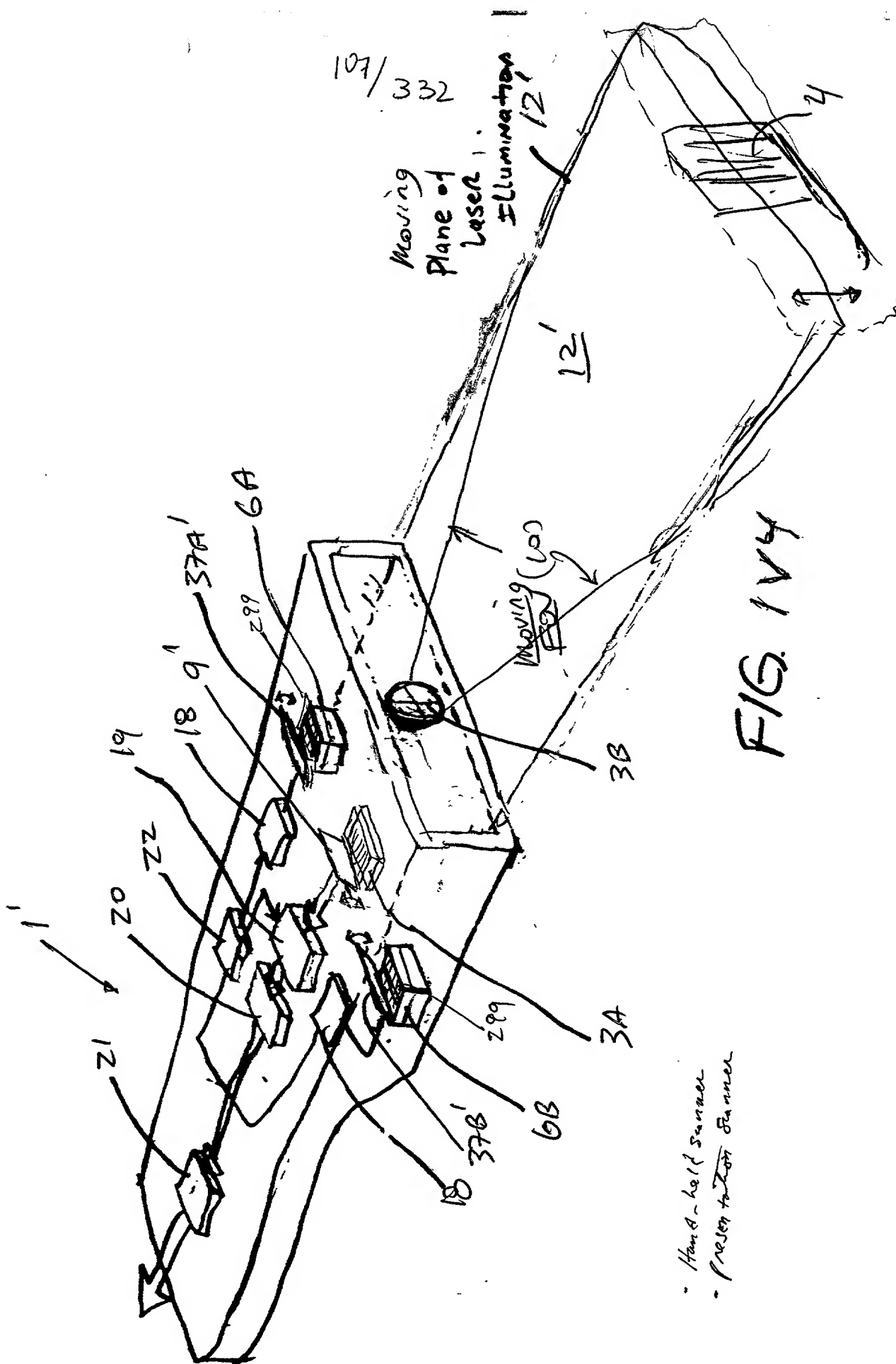


FIG. 144

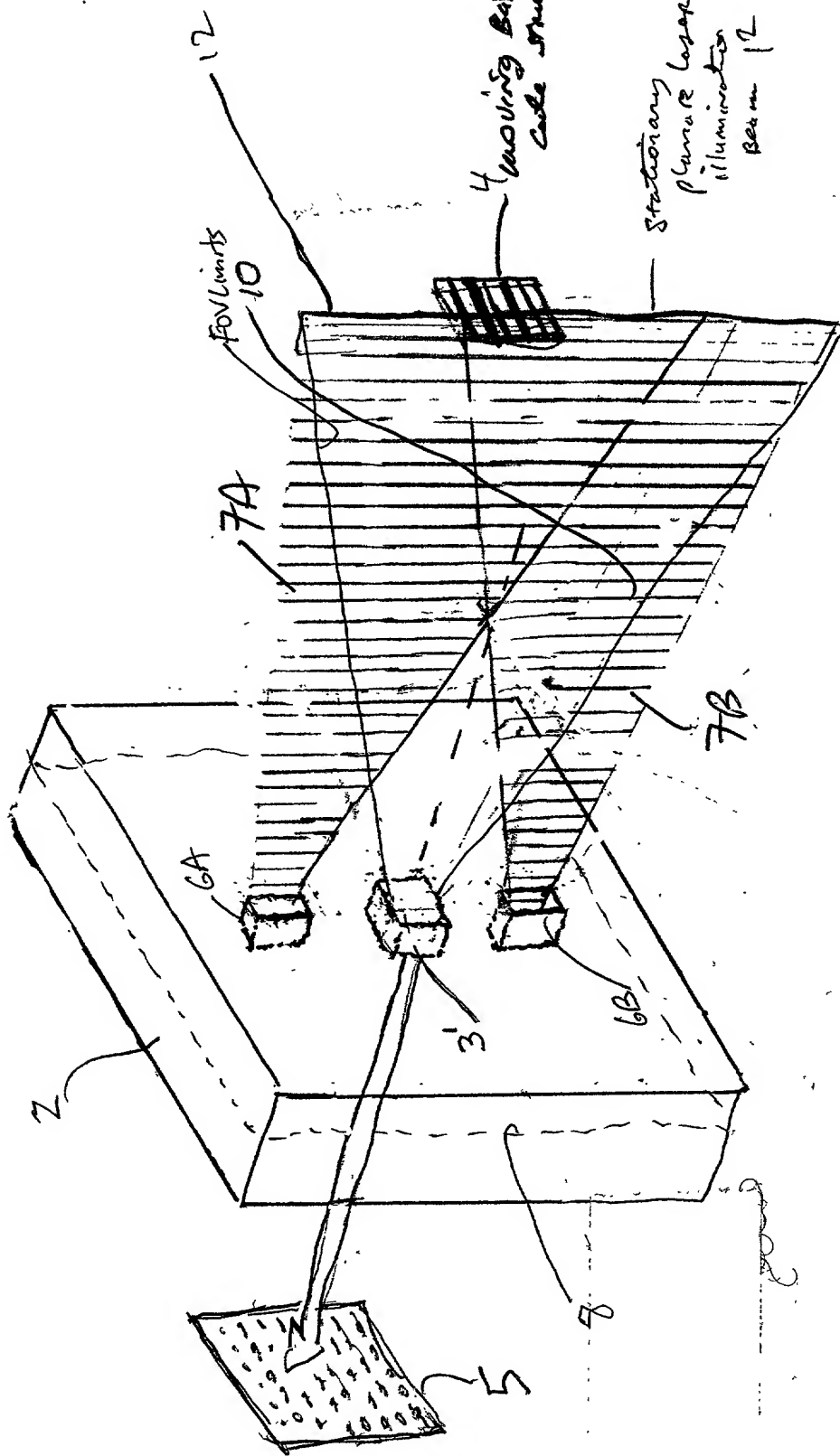
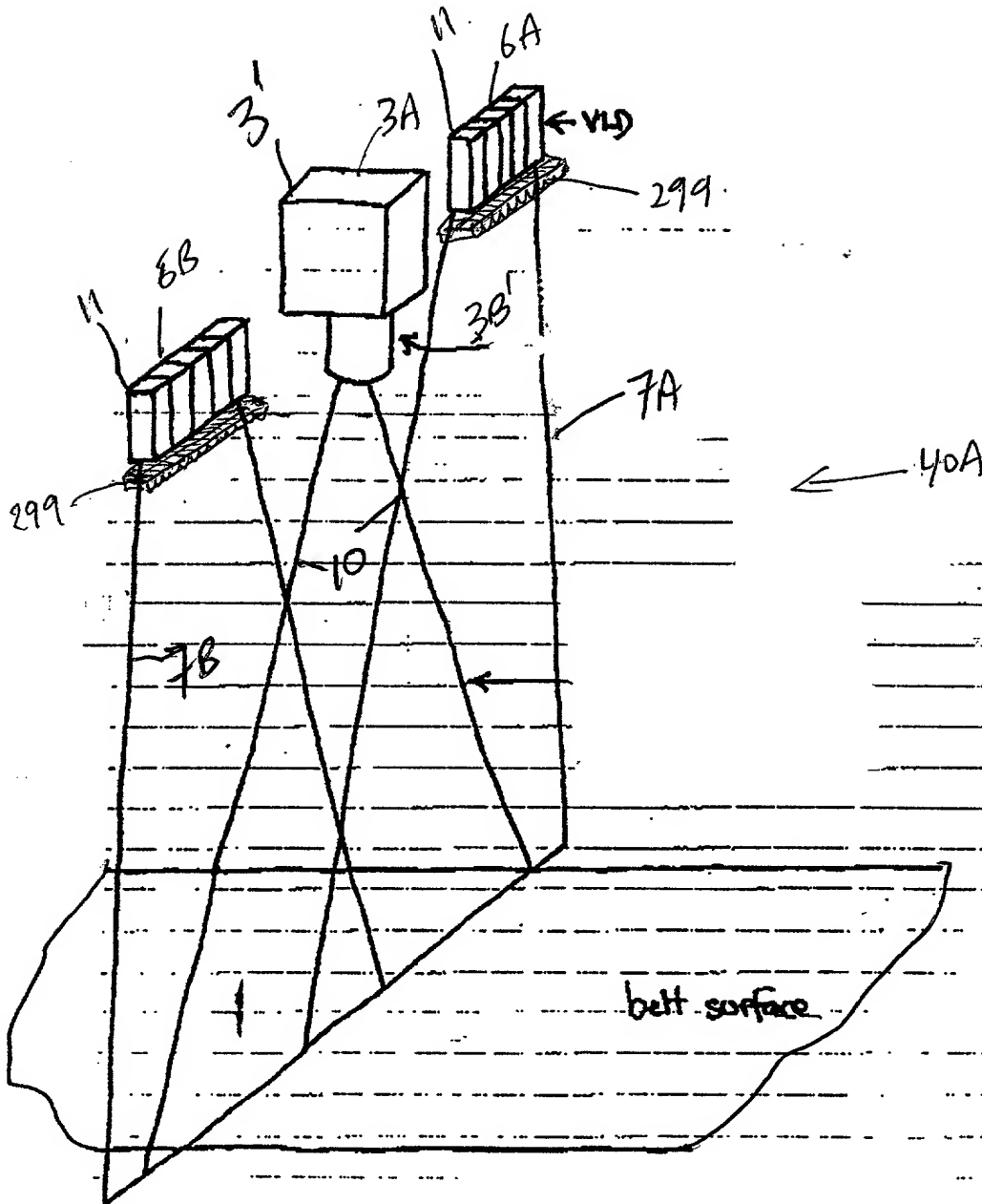


FIG. 2A





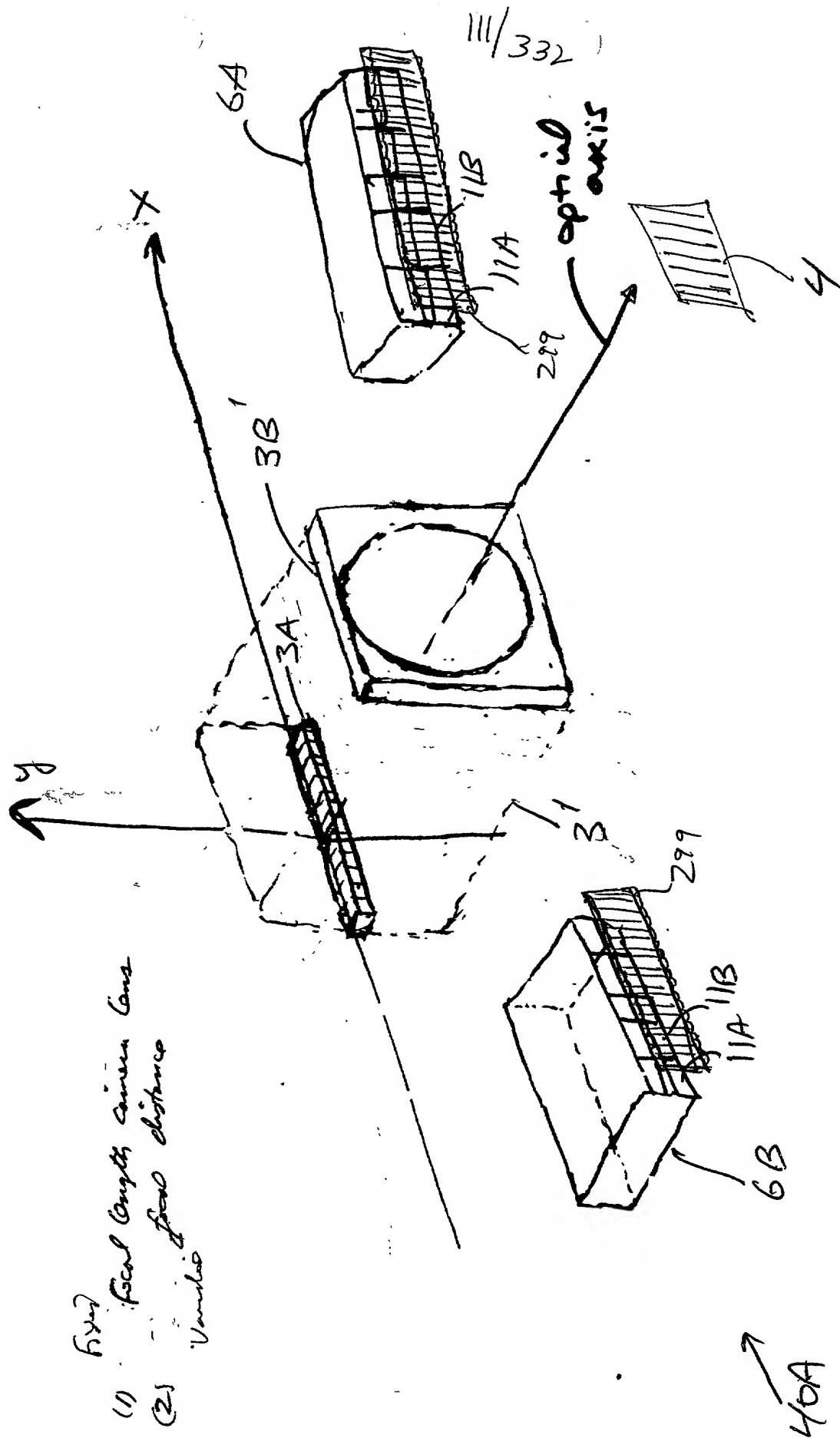


FIG. 2B2

- Fixed
- (1) focal length camera lens
  - (2) focal distance
- Variable

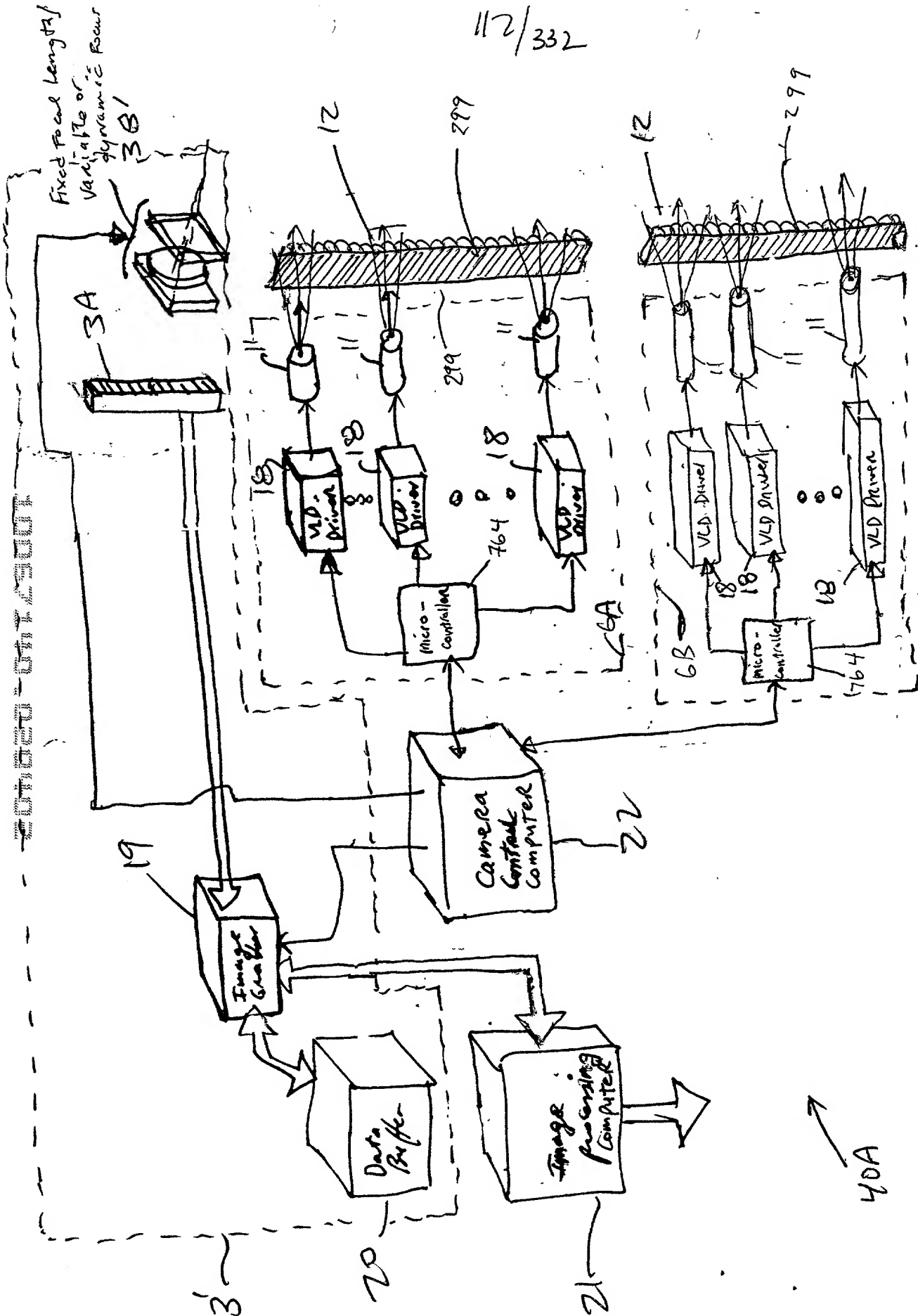


FIG. 2C1

FIG. 2C2

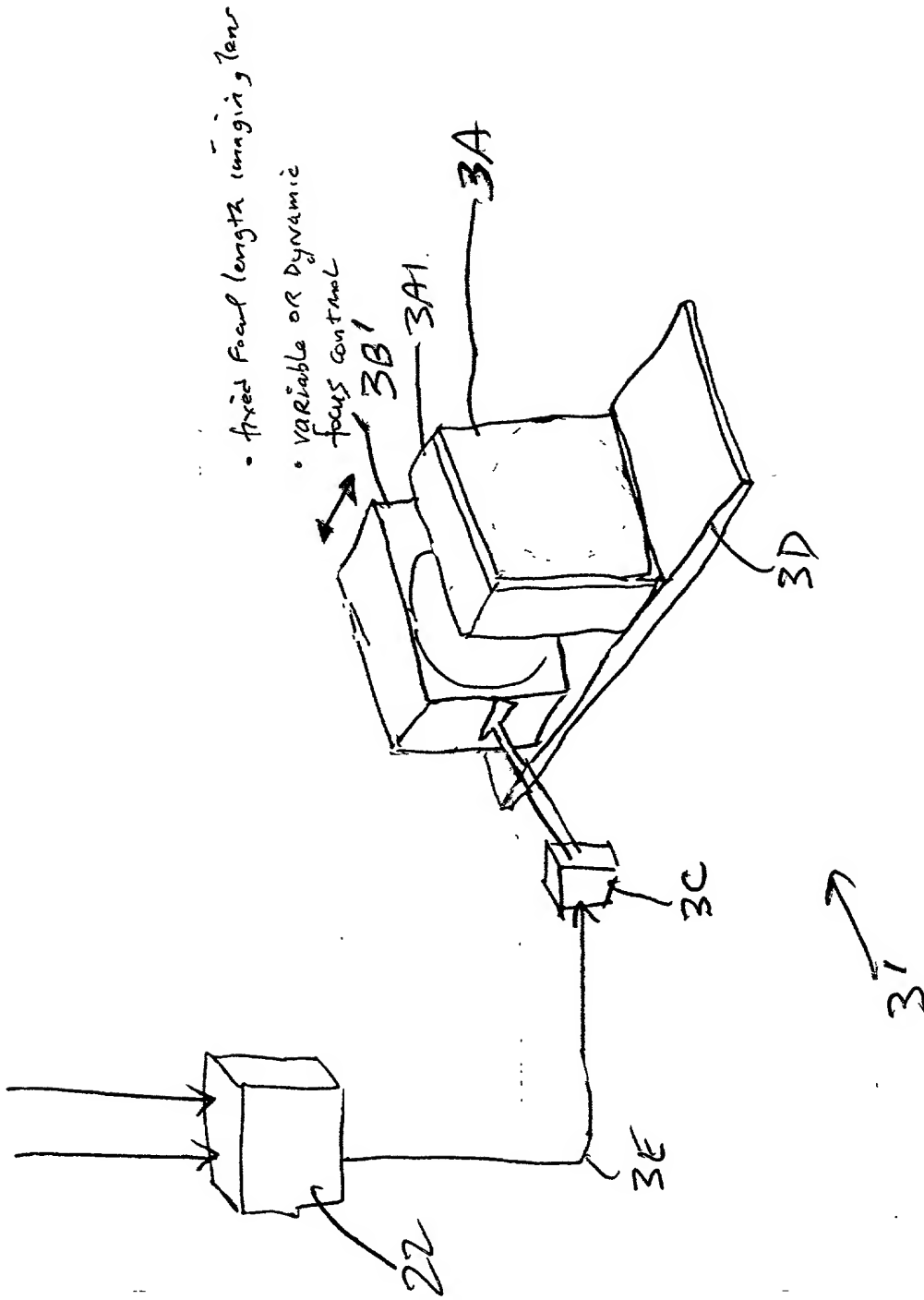


FIG. 2C2

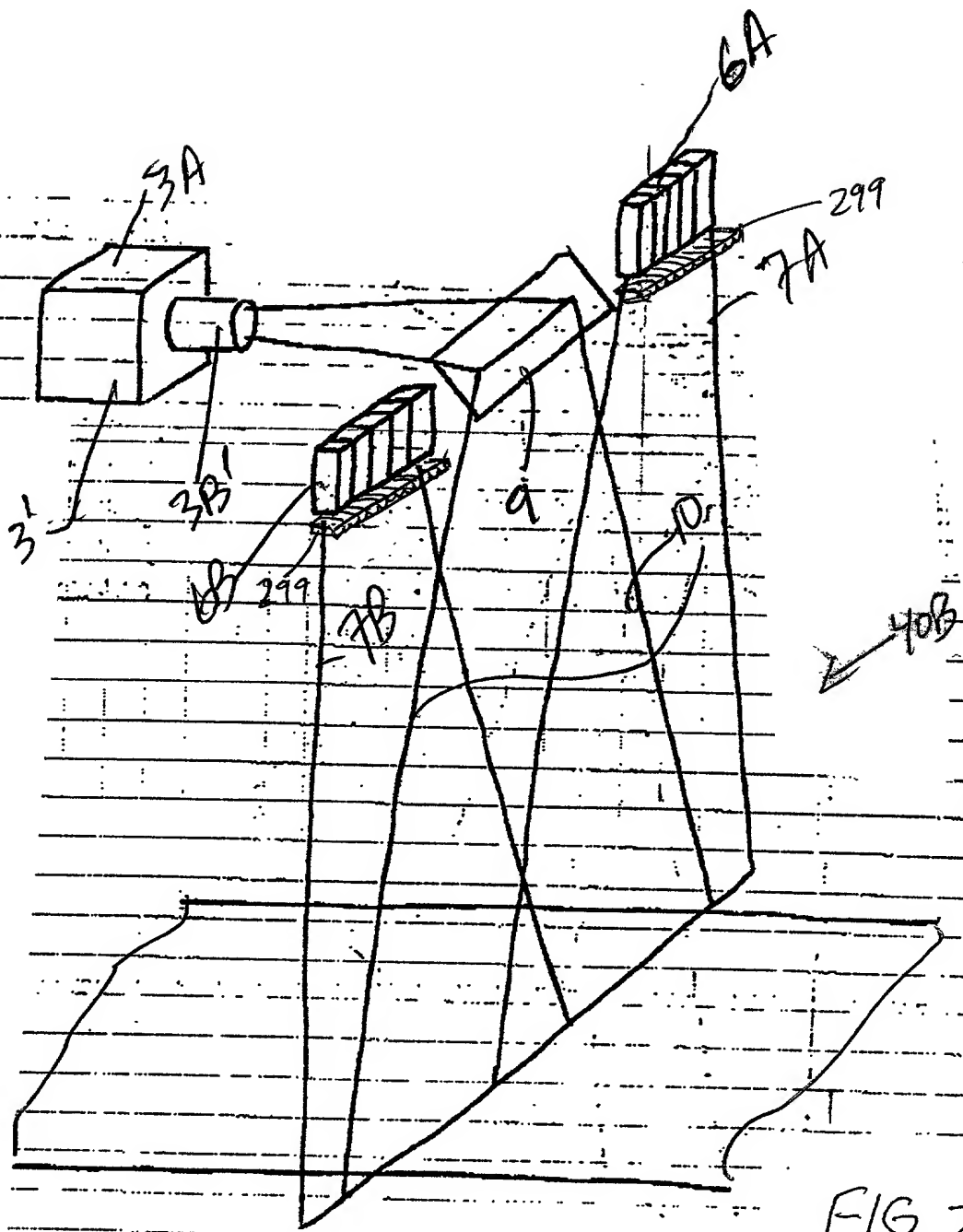


FIG. 2D1

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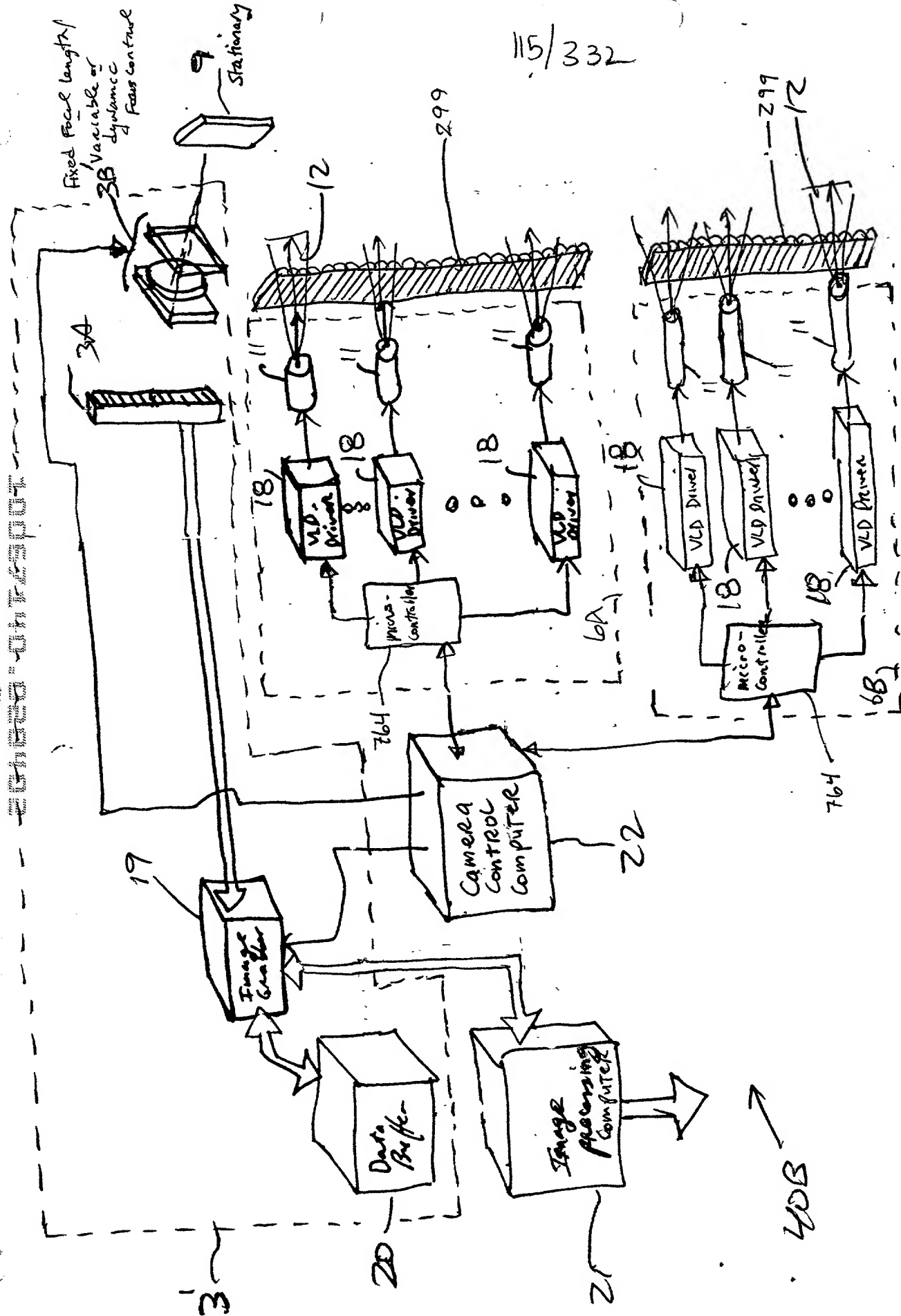


FIG. 2D2

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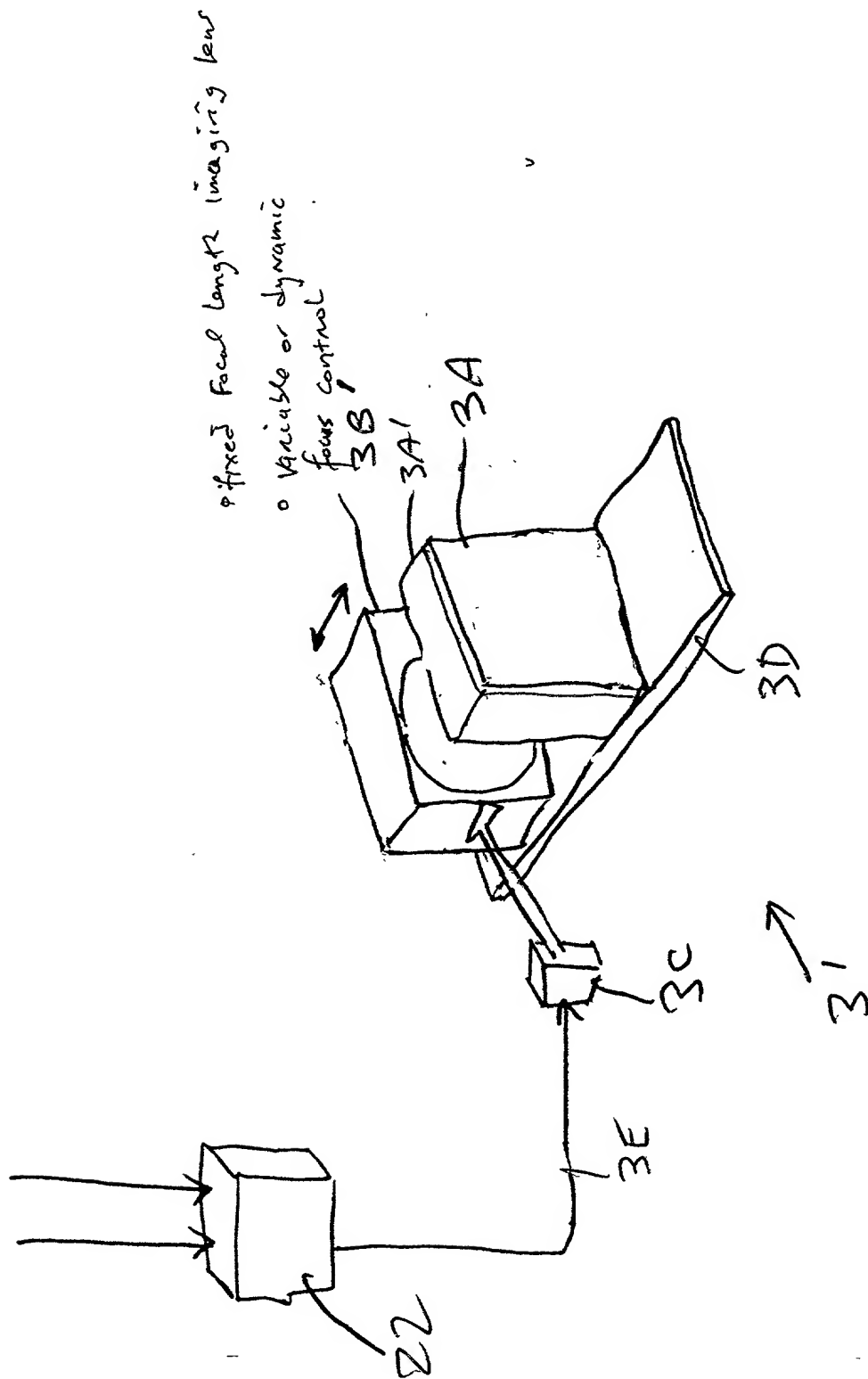


FIG. 2D3

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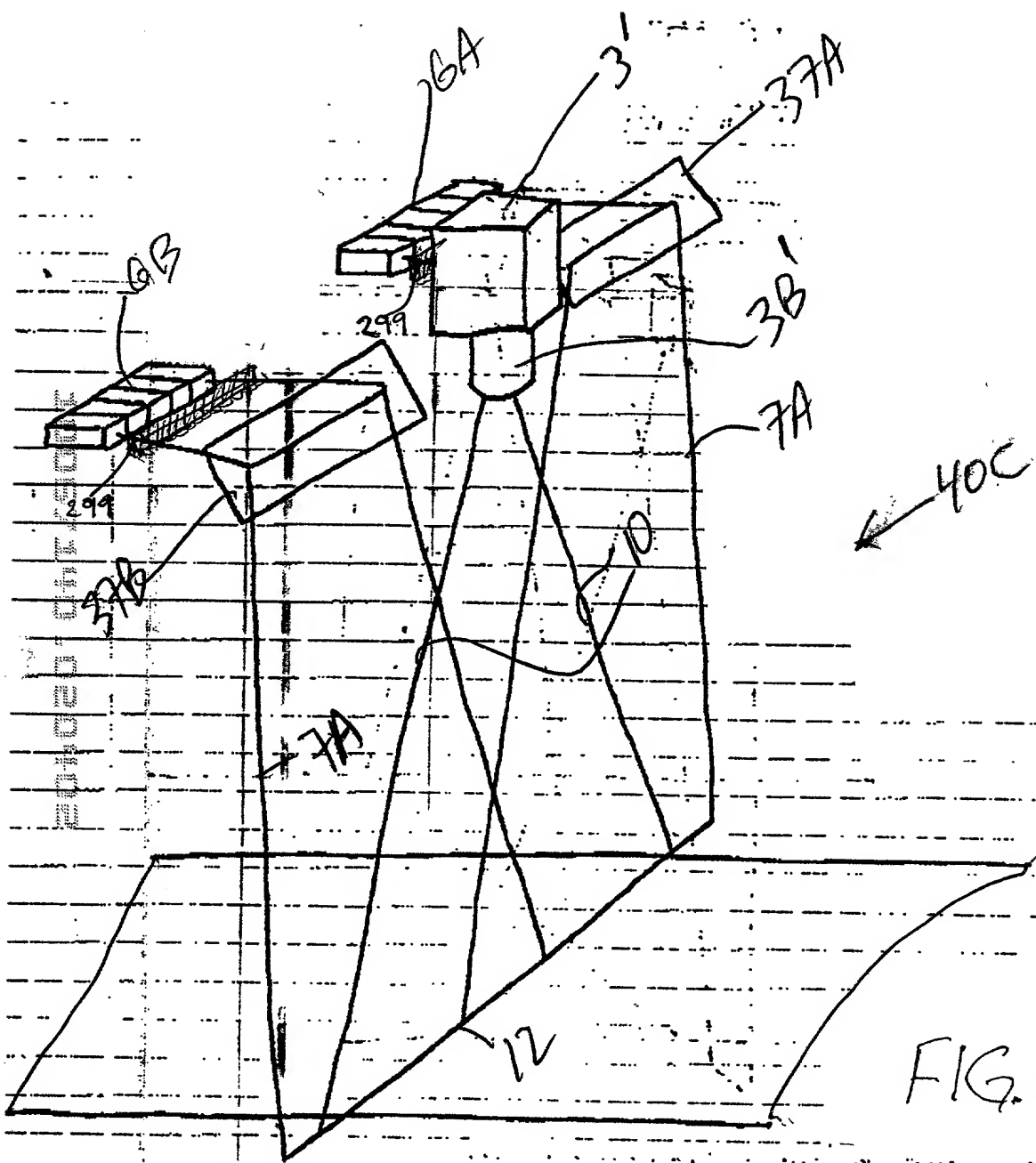


FIG. 2E1



FIG. 2E2

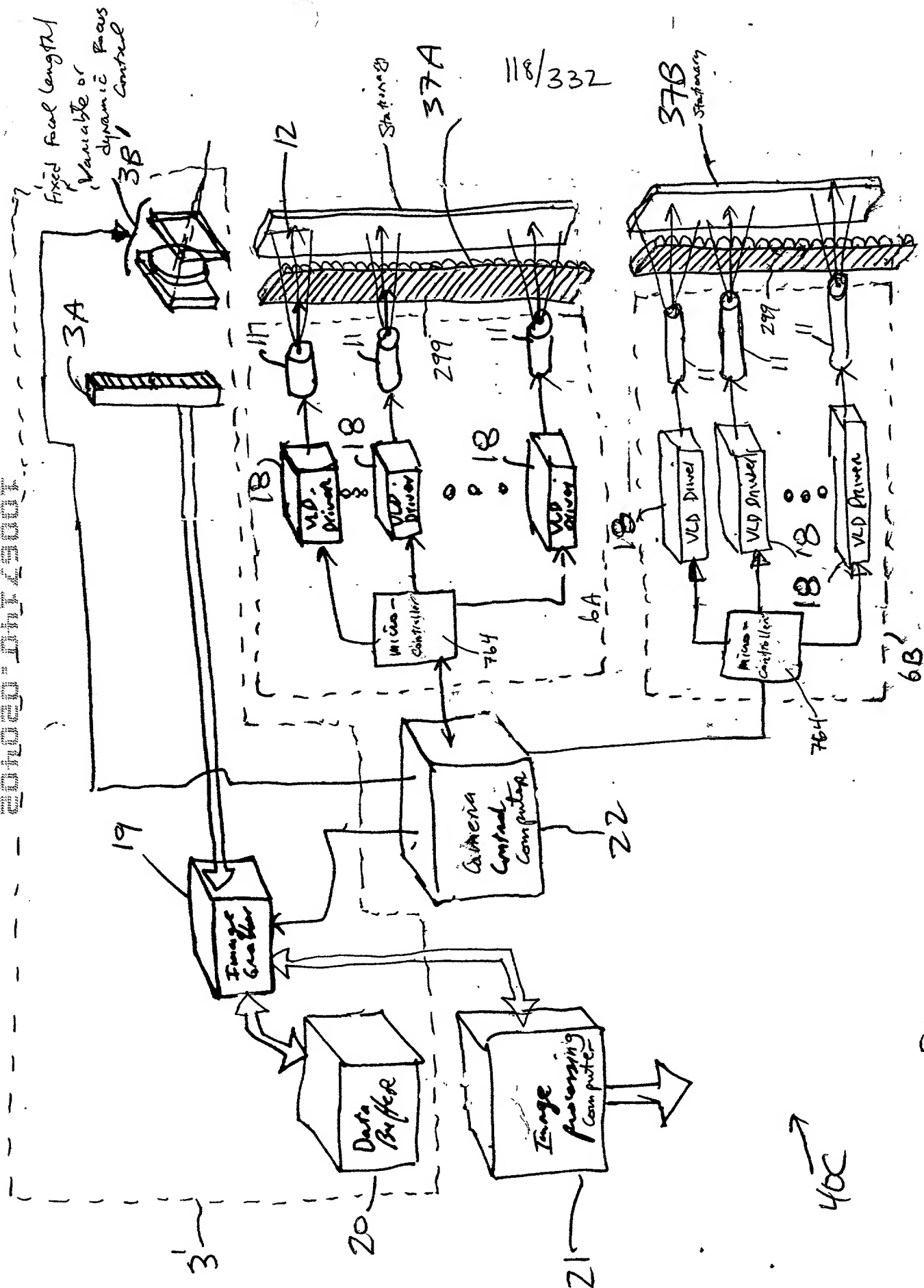


FIG. 2E2

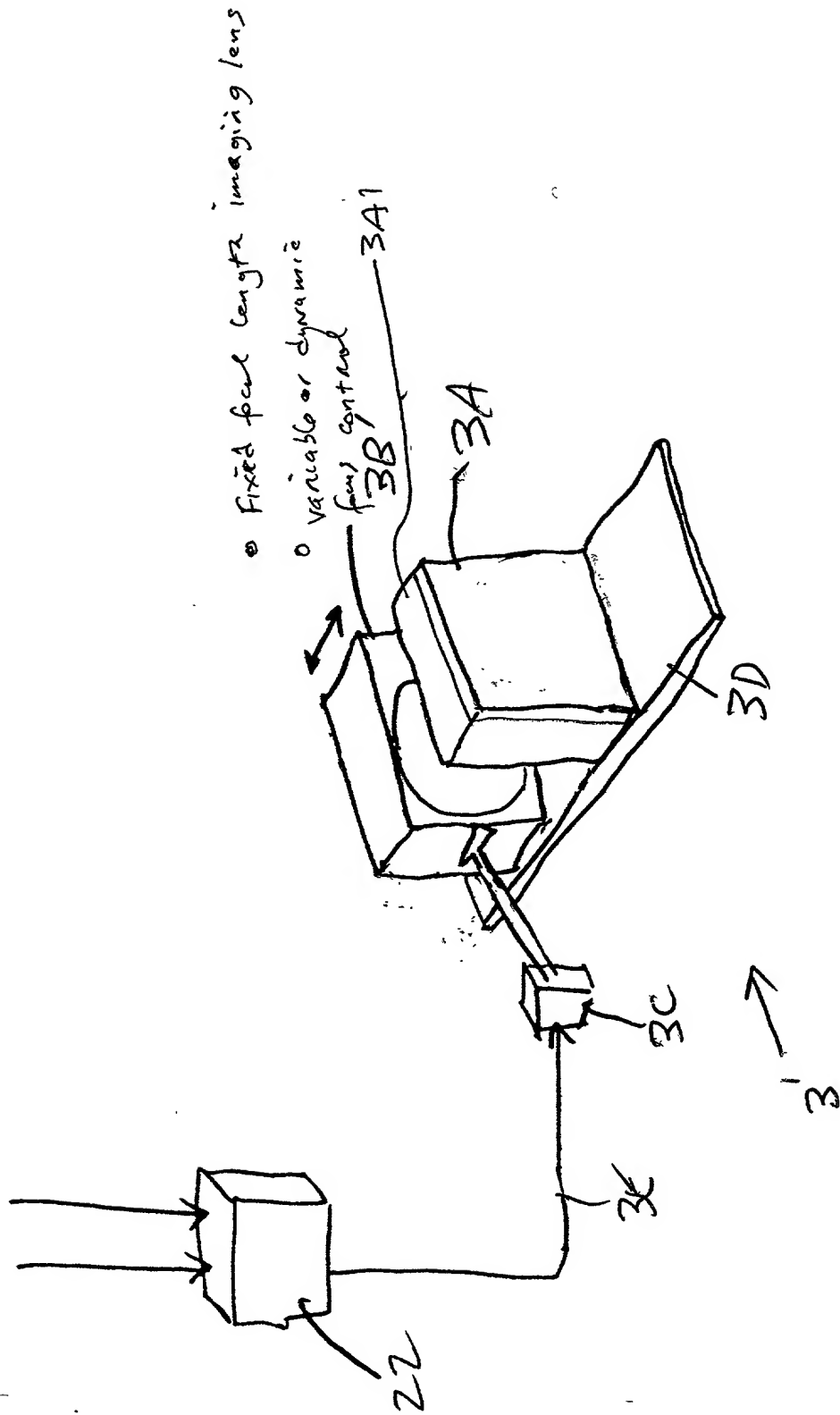


FIG. 2E3

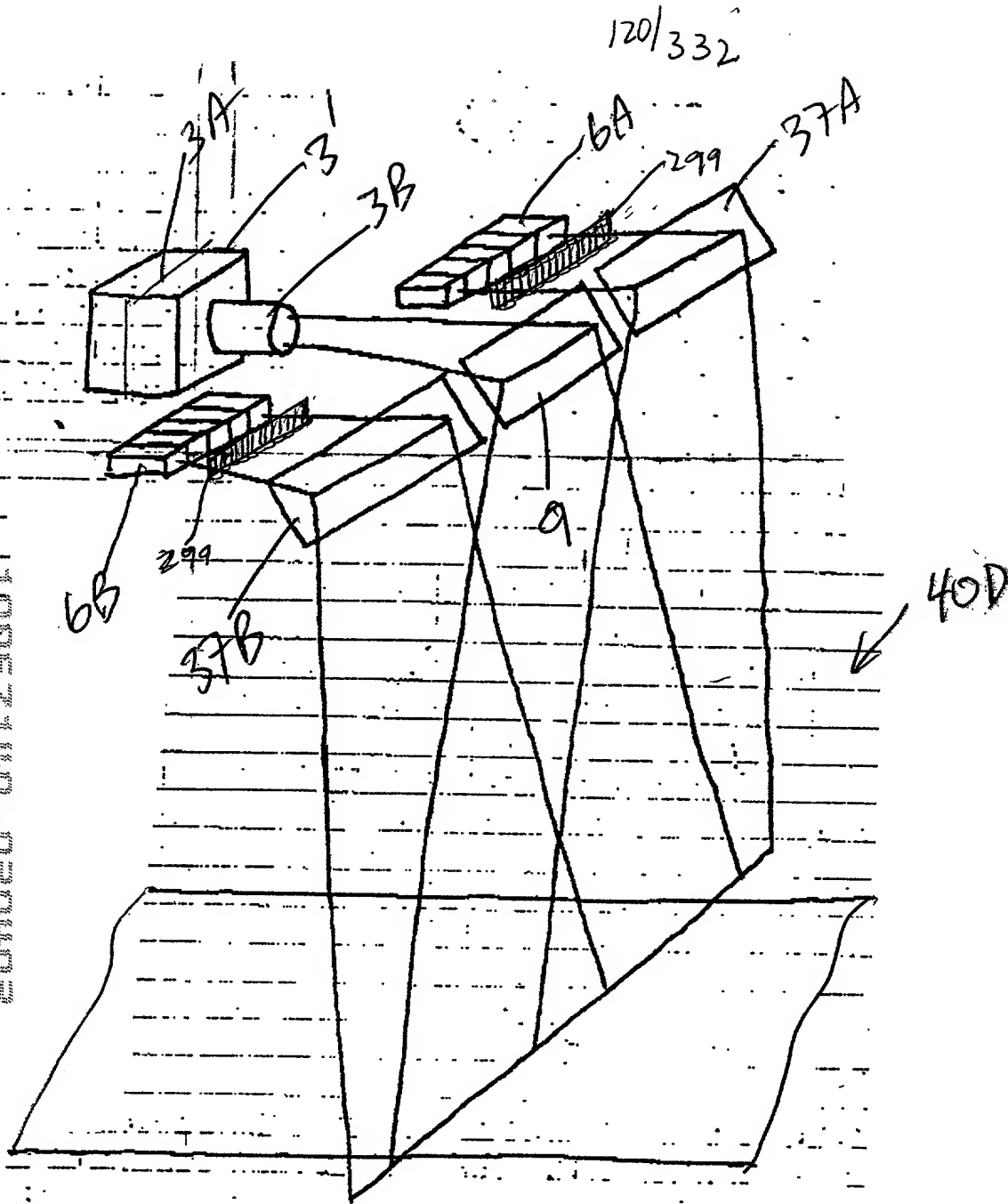


FIG. 2F1

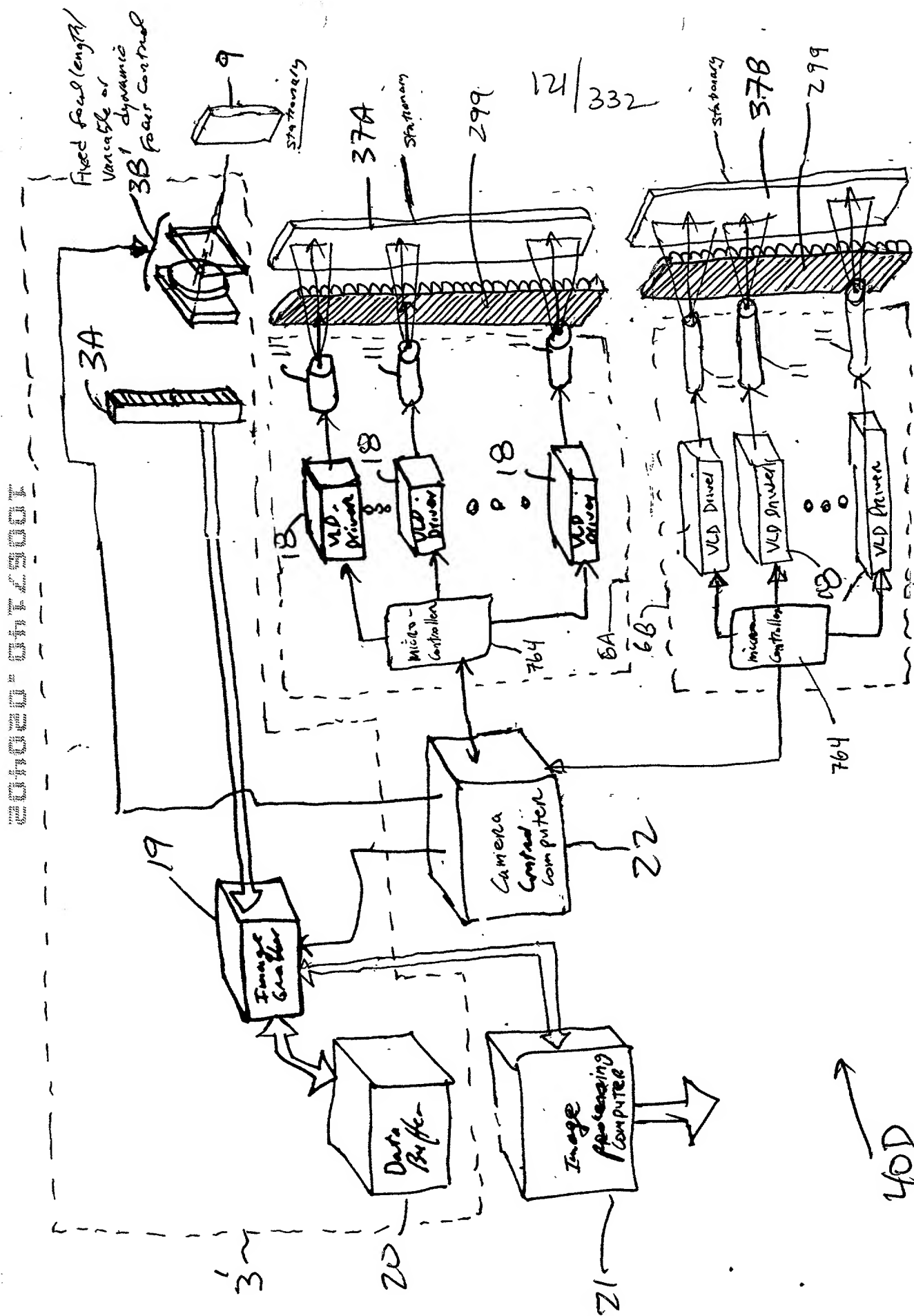
[illegible]

FIG 2FZ

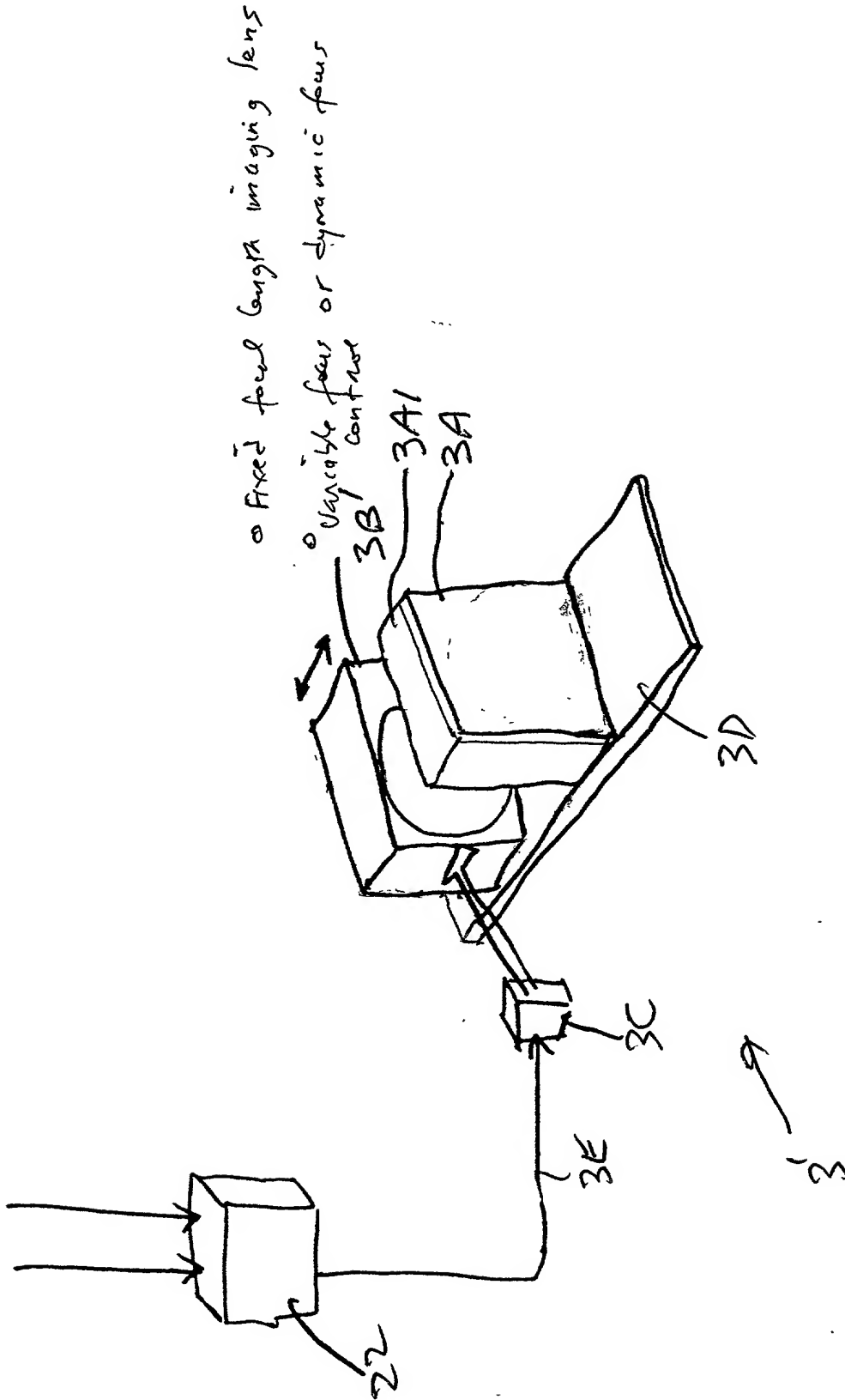


FIG. 2F3

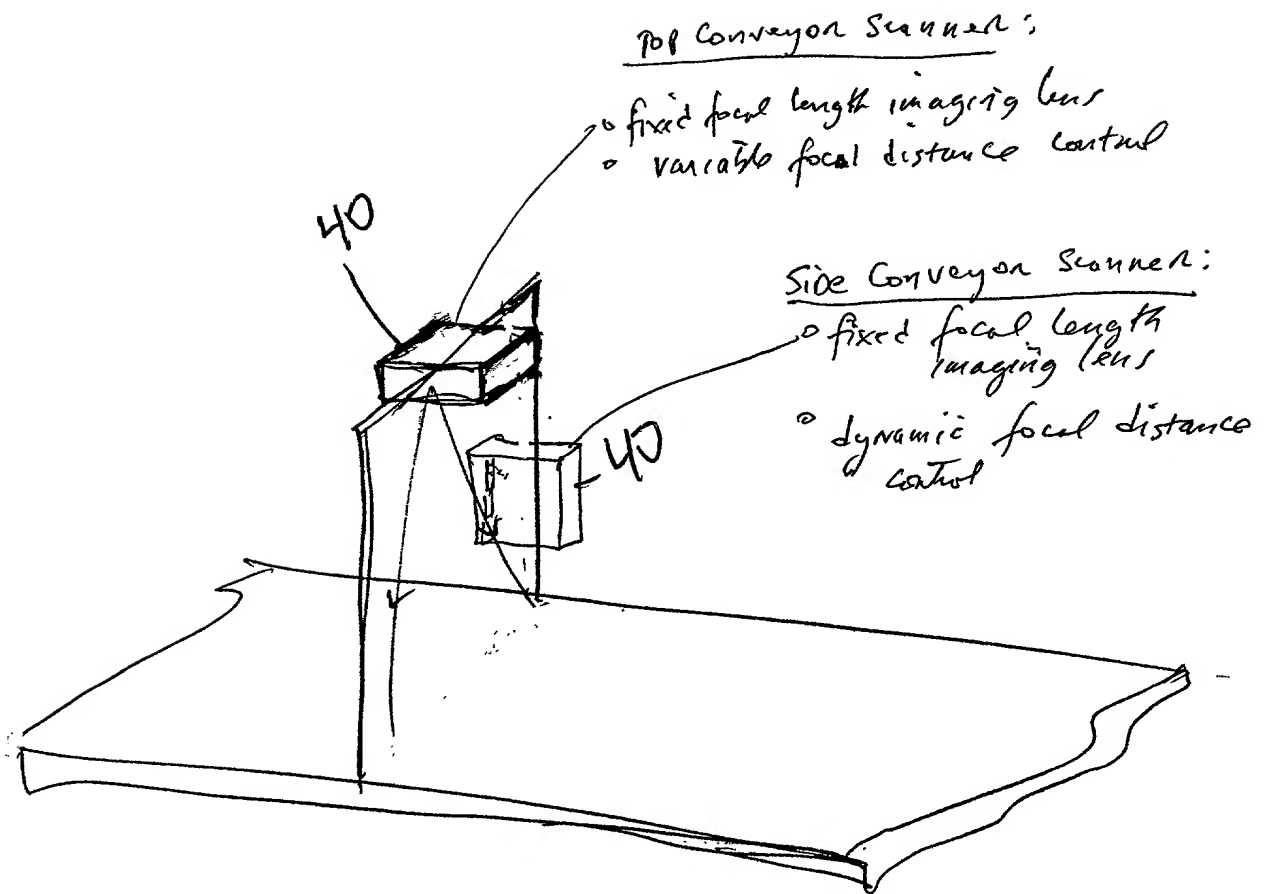
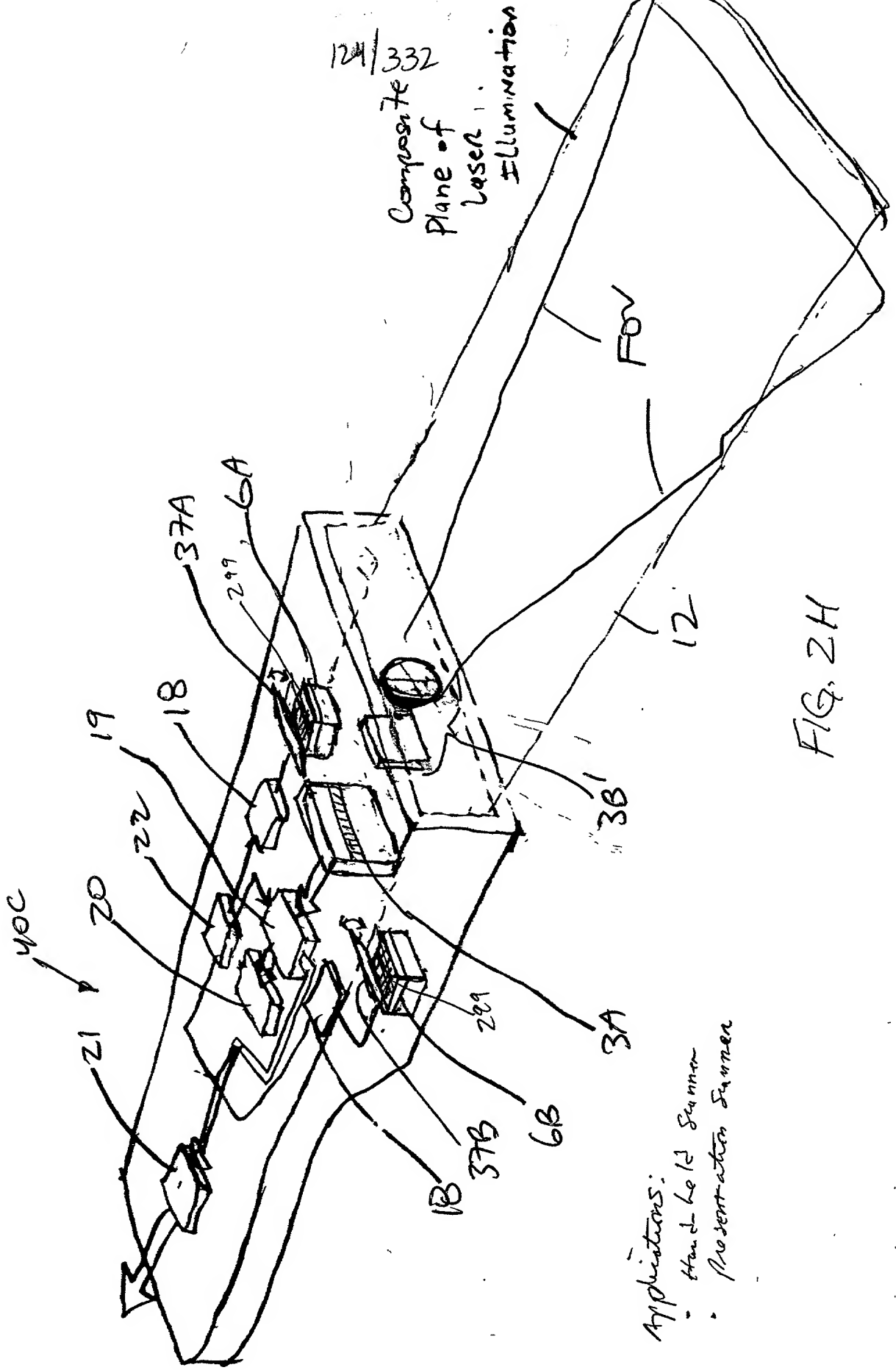


FIG. 2G



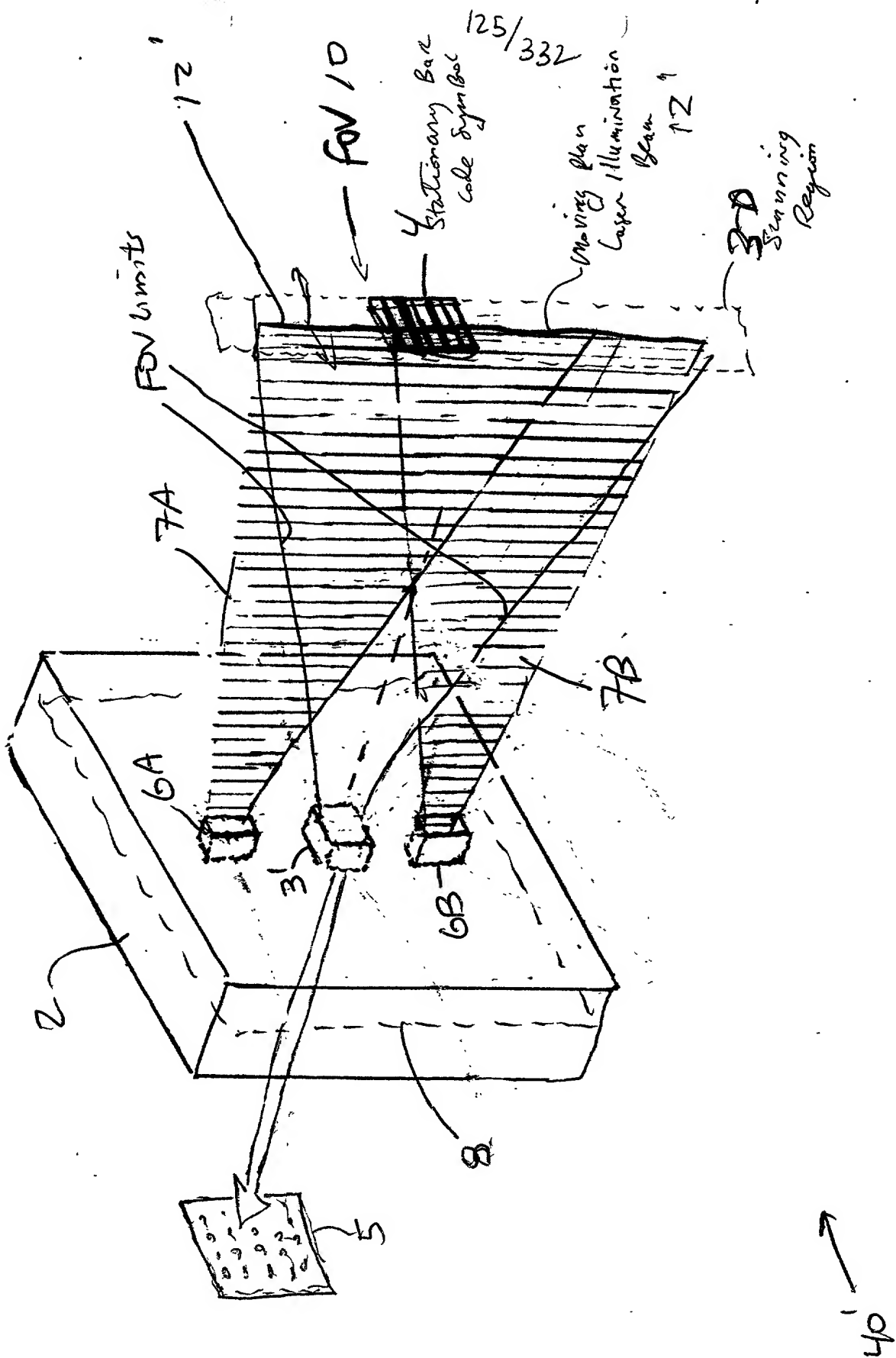
124/332  
Composite  
Plane of  
Laser  
Illumination

FOV

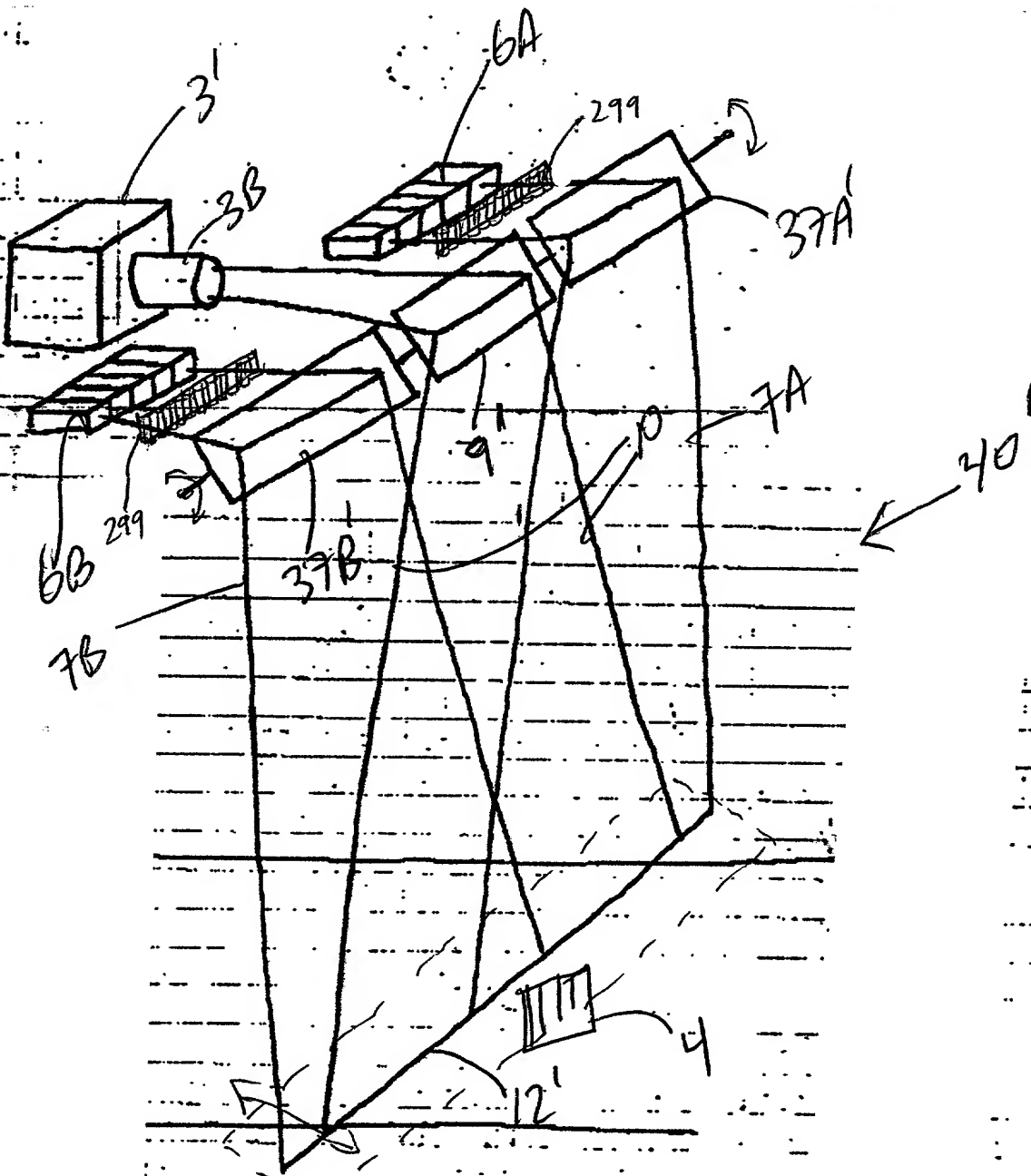
12

FIG. 2H

Applications:  
- Hand held Scanner  
- Presentation Scanner







3-D  
Scanning  
Region

FIG 2I2

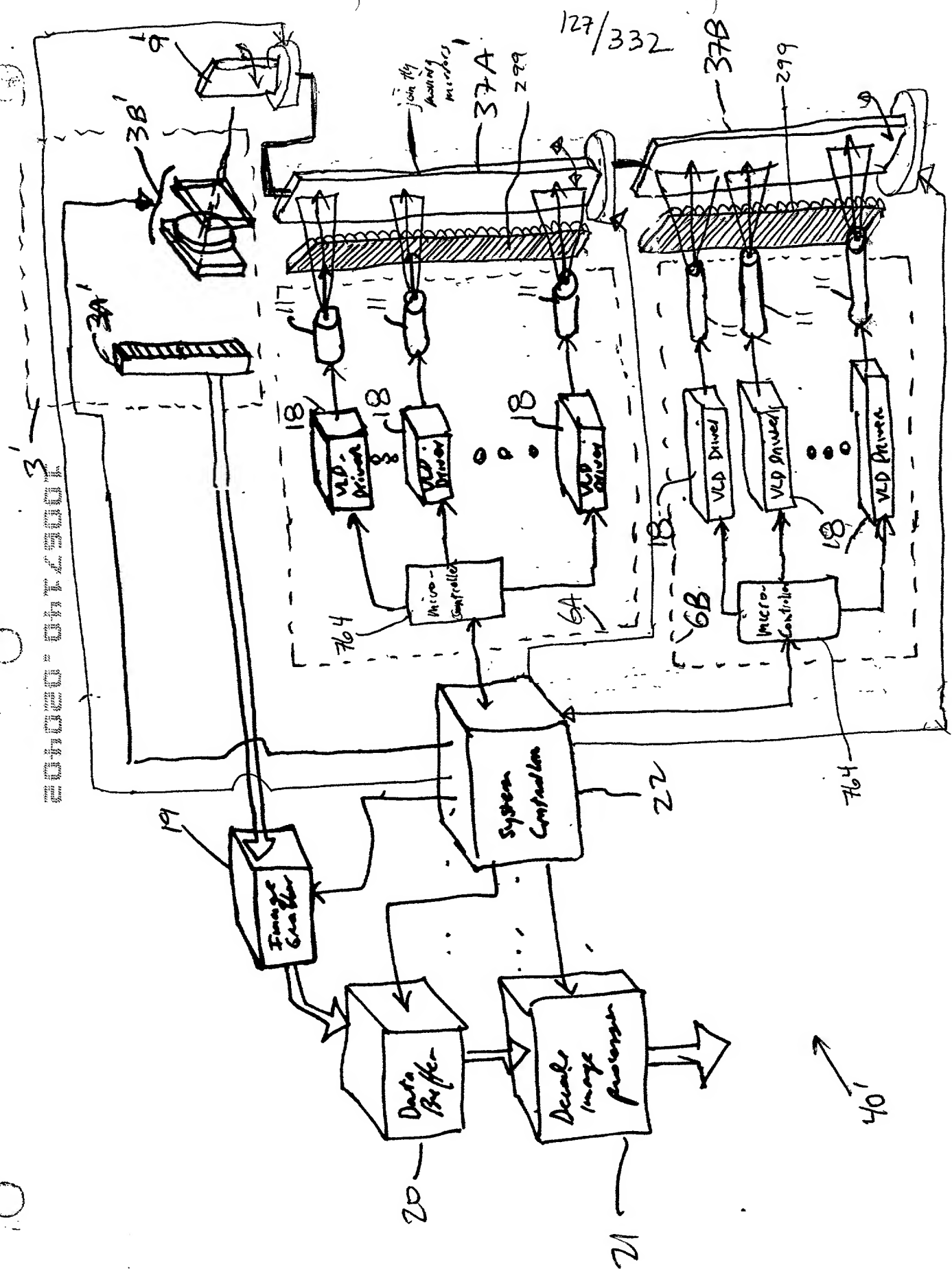


FIG. 2I3

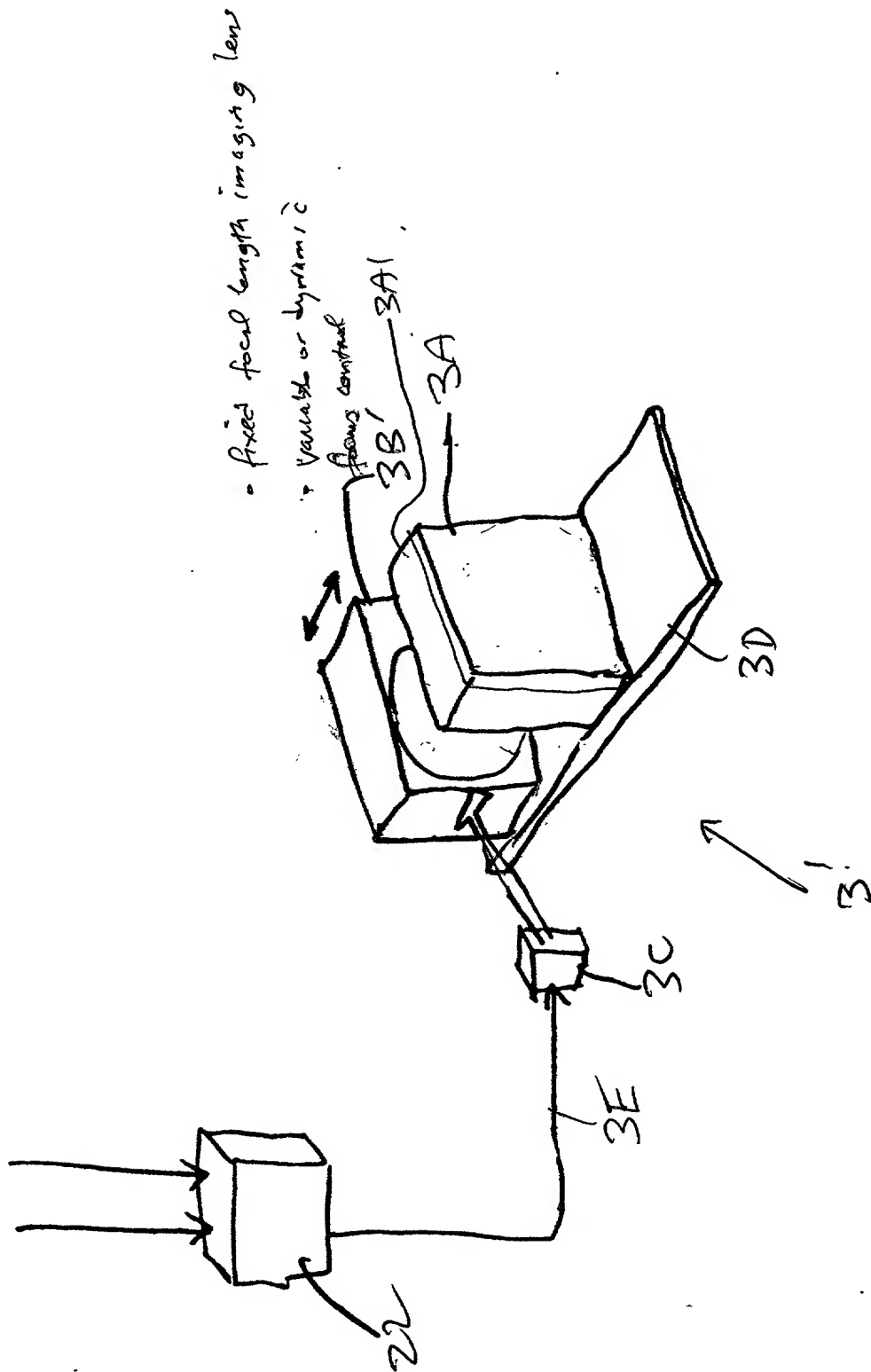


FIG. 2I4

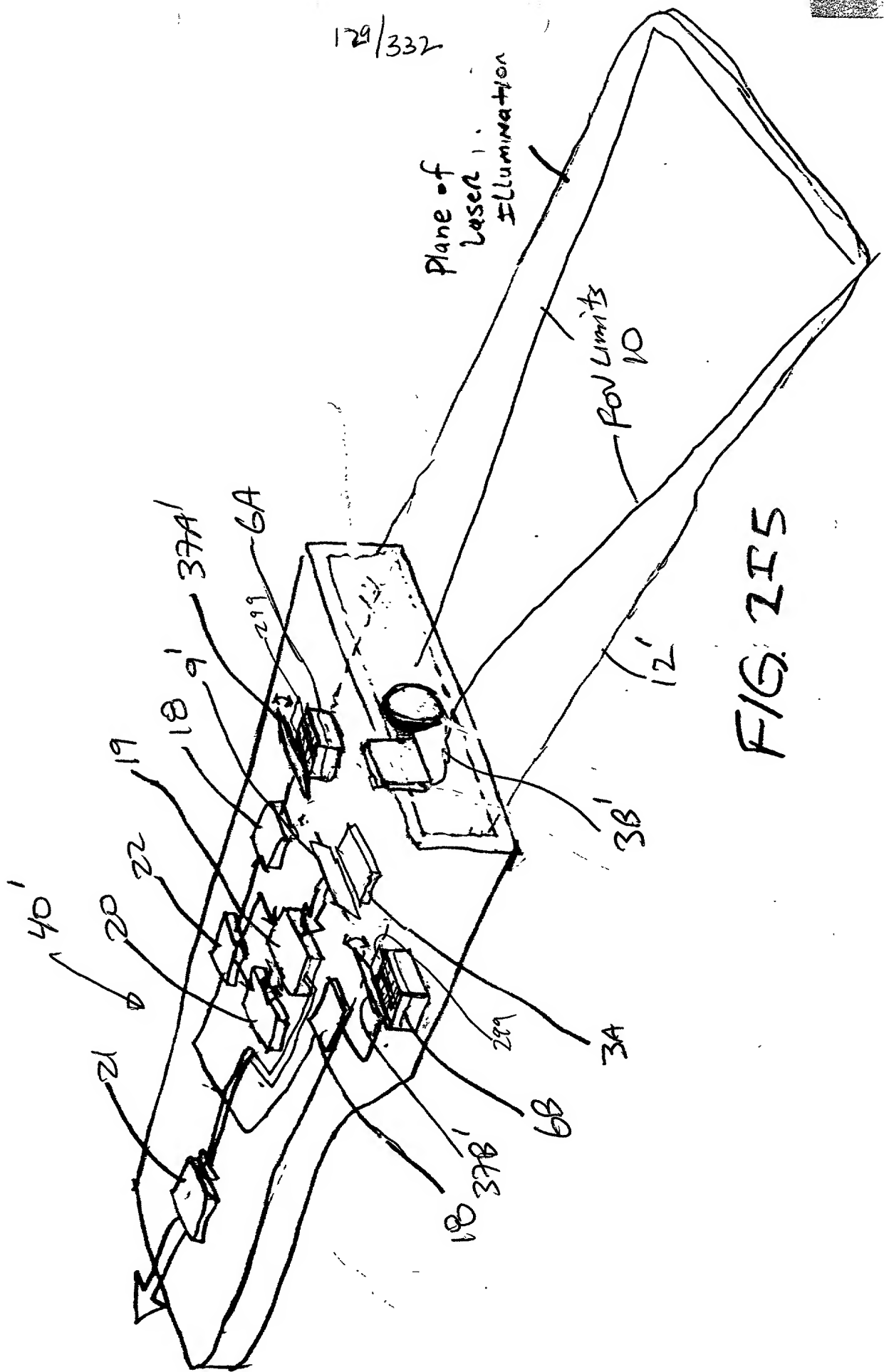


FIG. 215

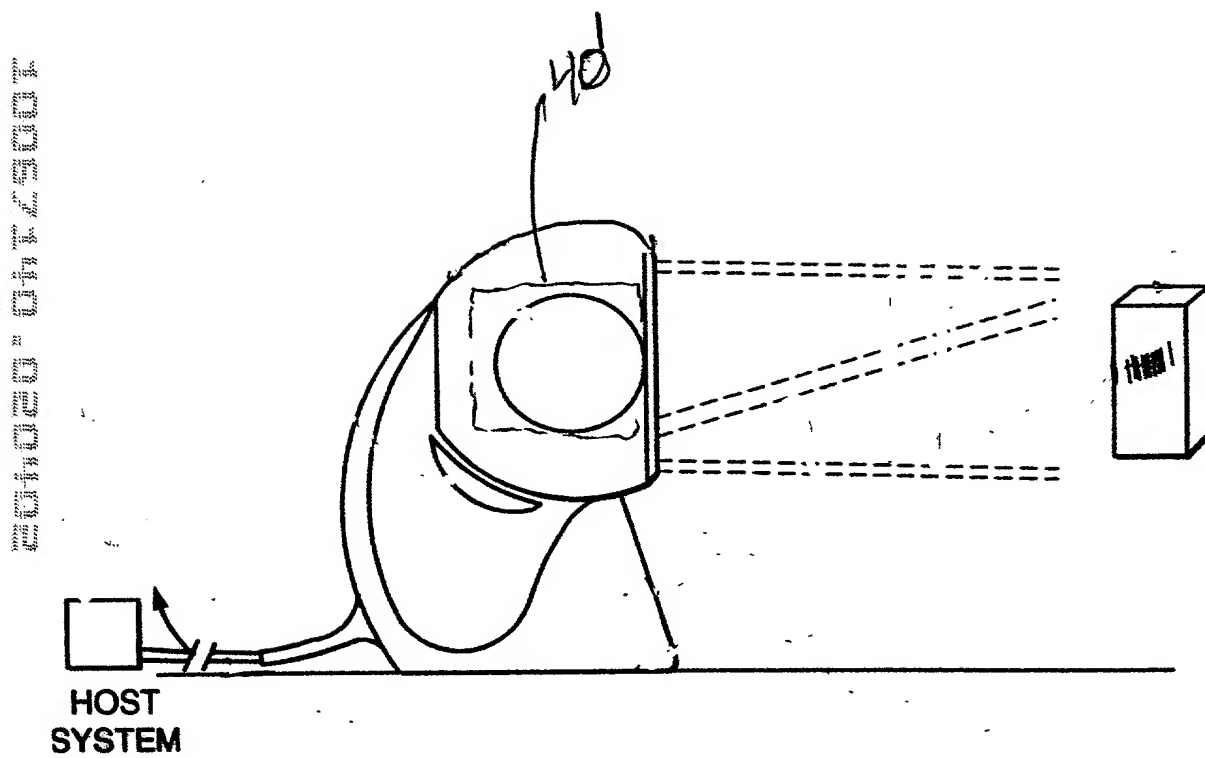


FIG. 2I6



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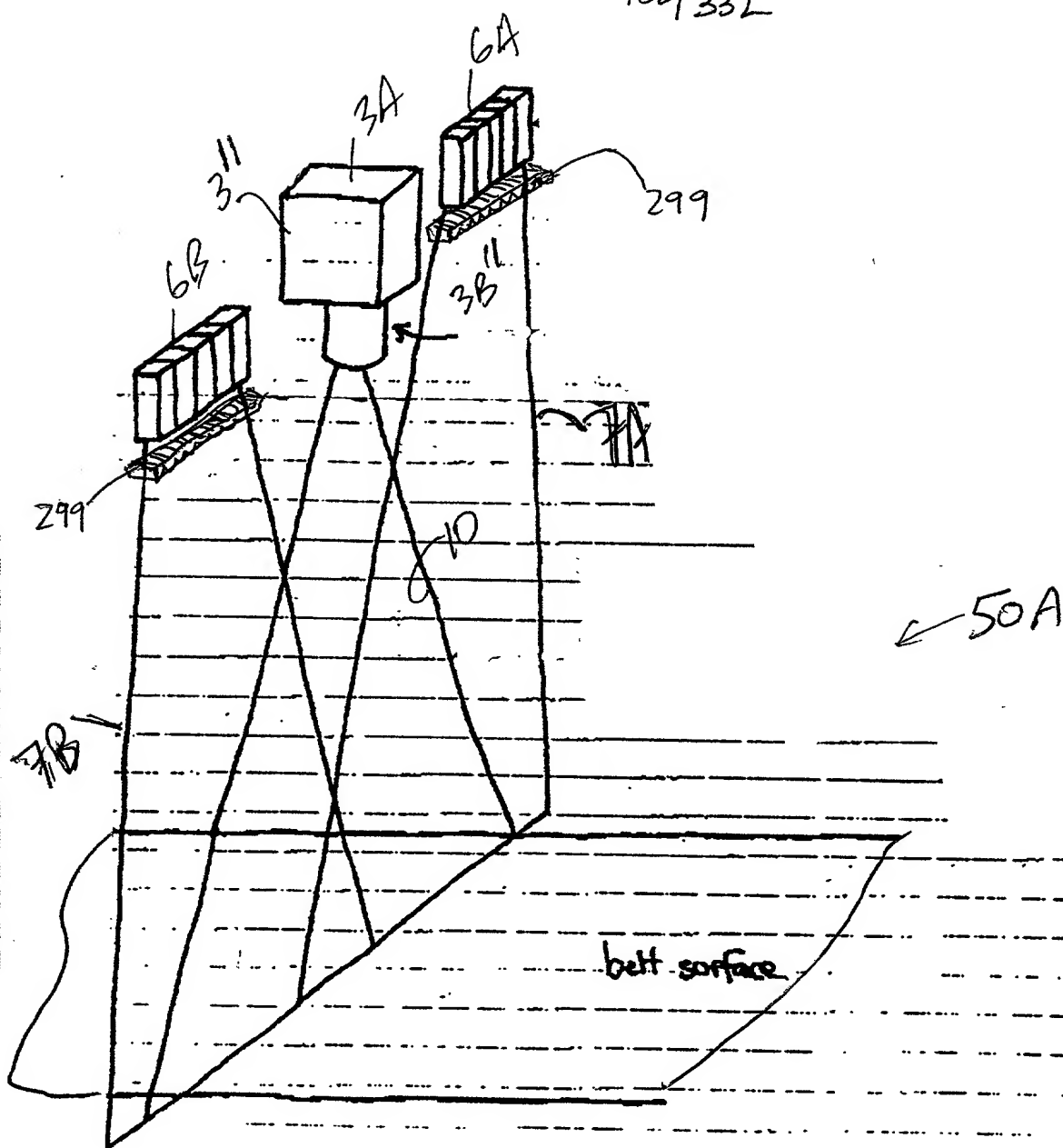
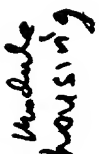


FIG. 3B1

622 / optical axis



(1) Measurable local lengths since cons

(2) variable local distance

Fig. 382



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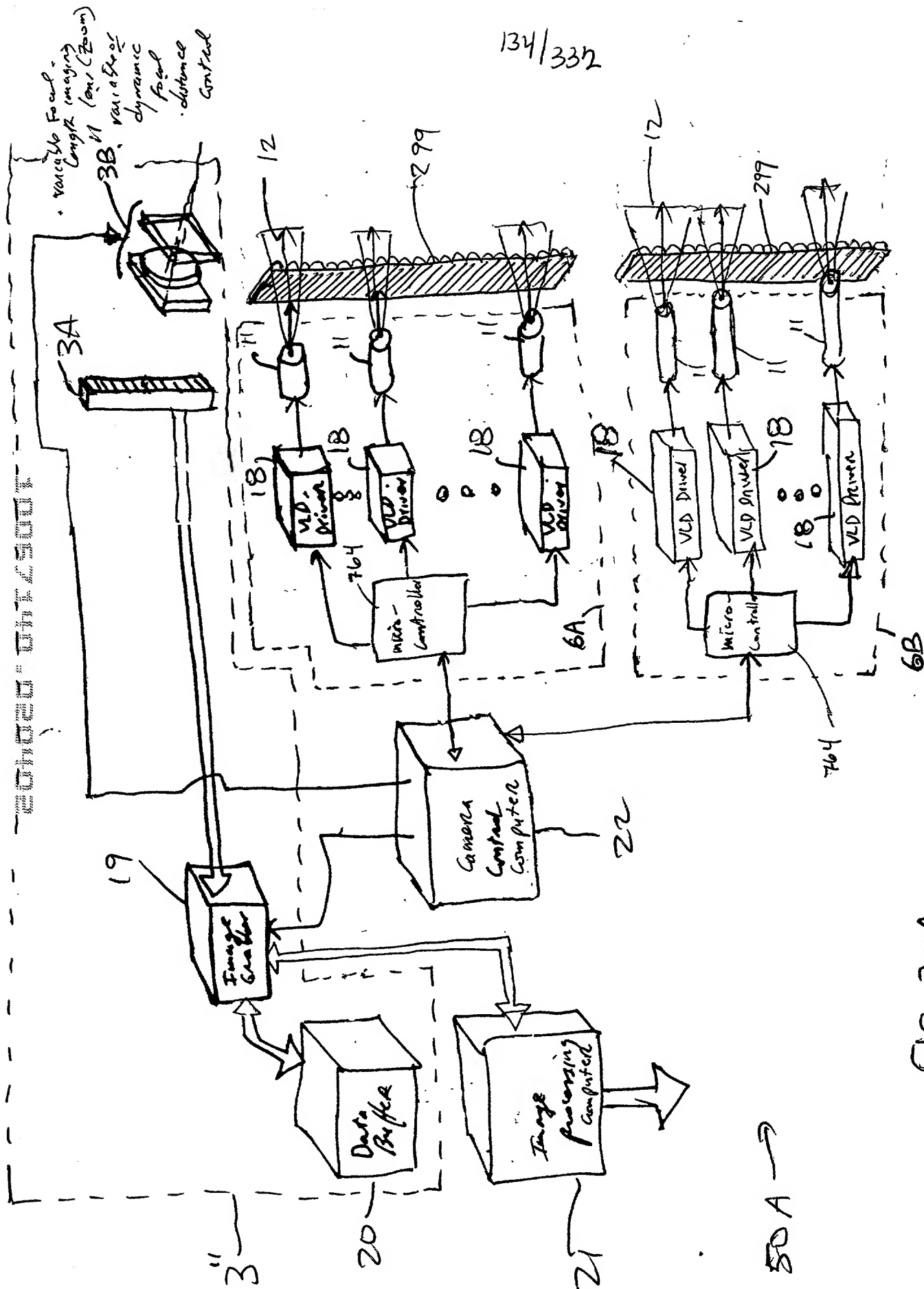
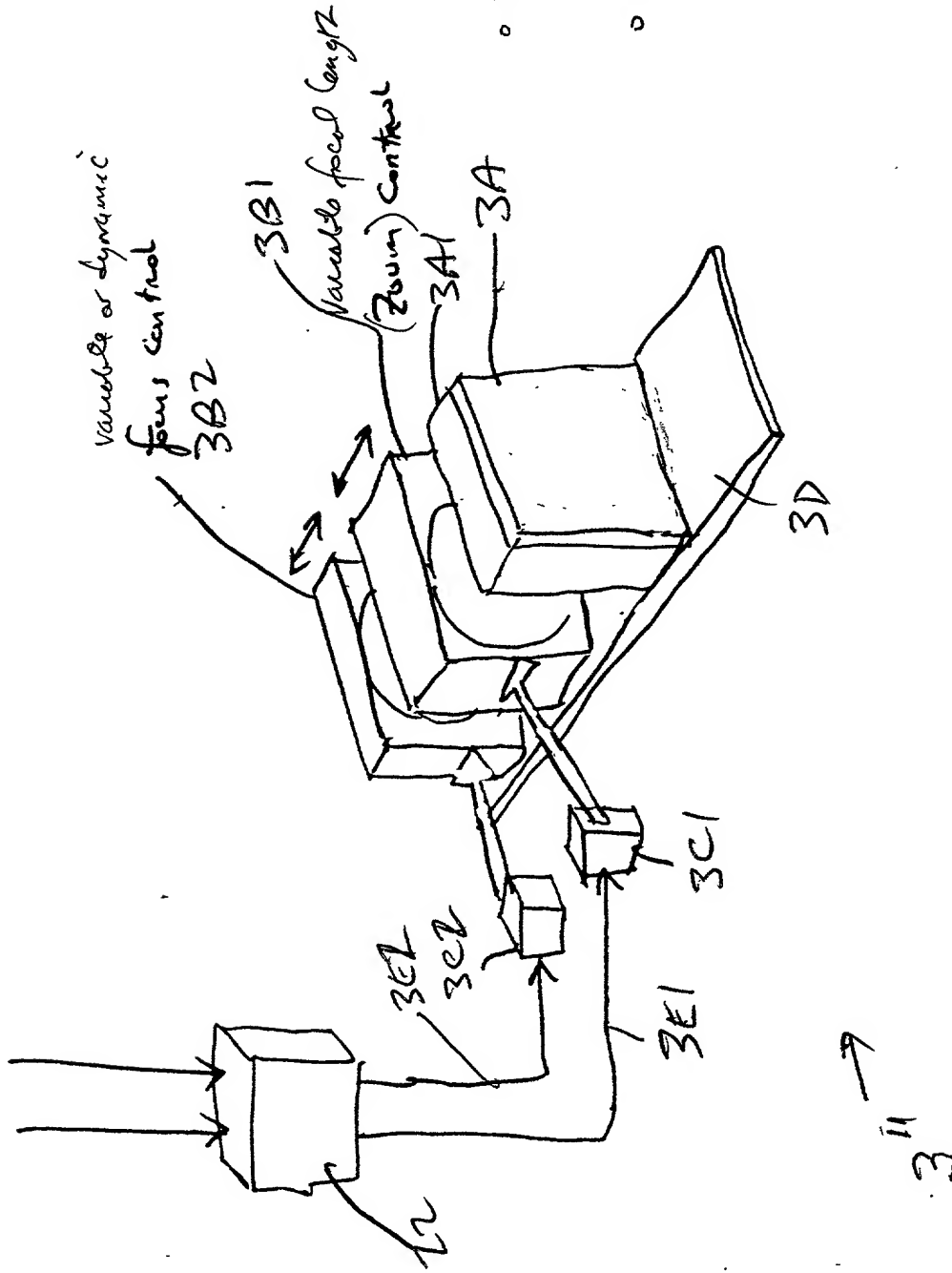


FIG 3C1

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- Variable focal length camera lens
- Variable focal distance

FIG. 3CZ

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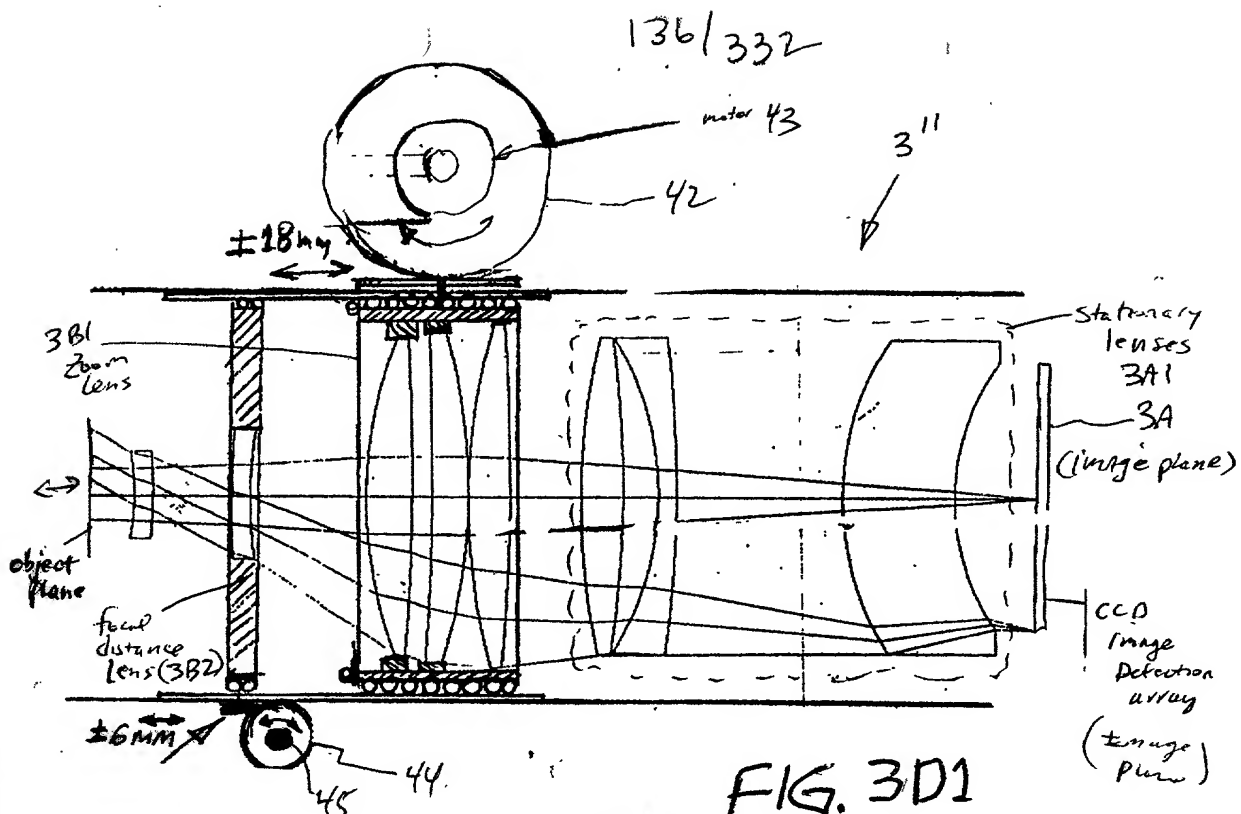


FIG. 3D1

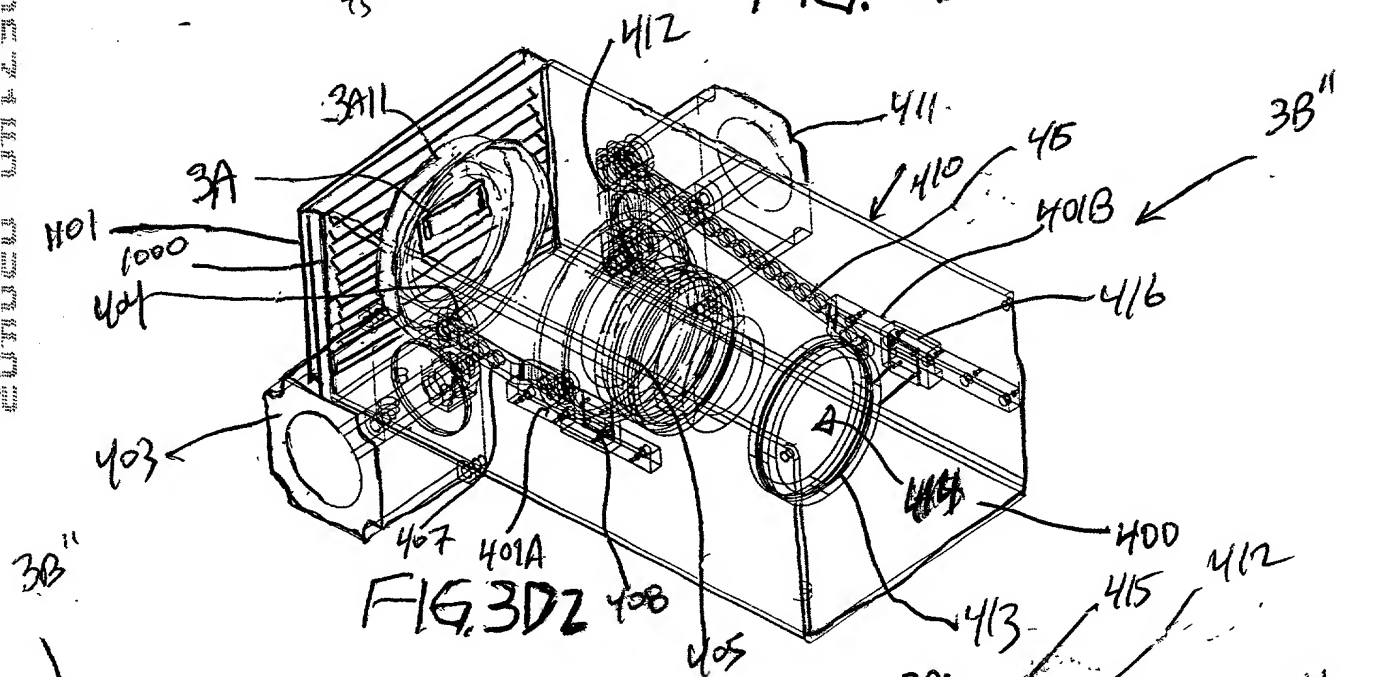


FIG. 3D2

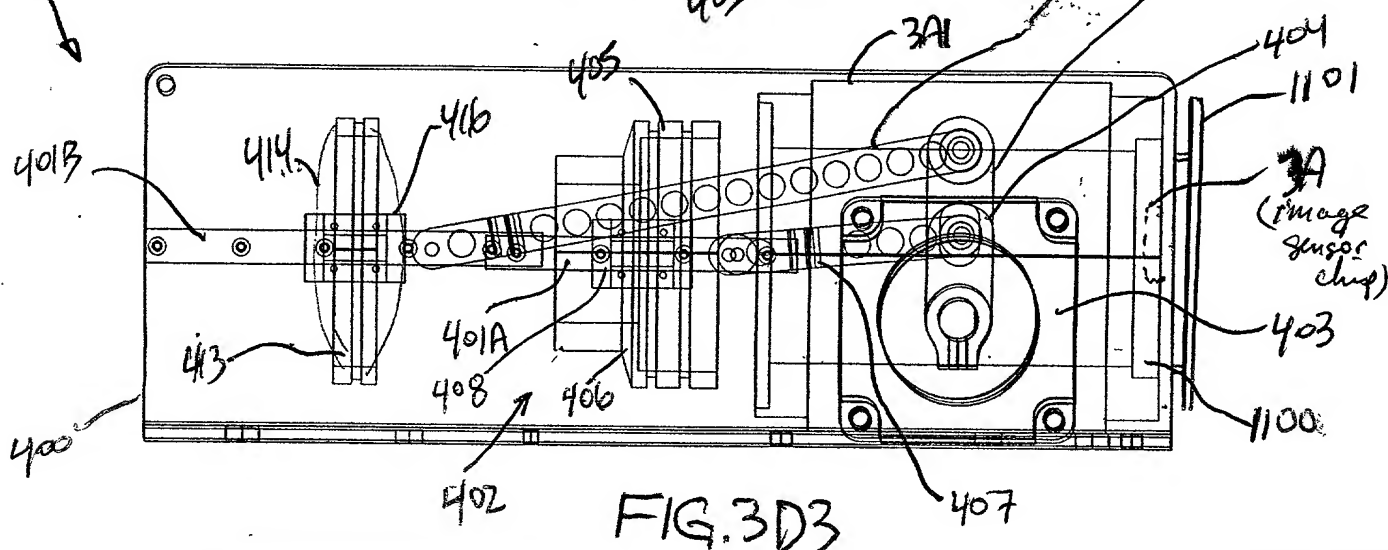


FIG. 3D3

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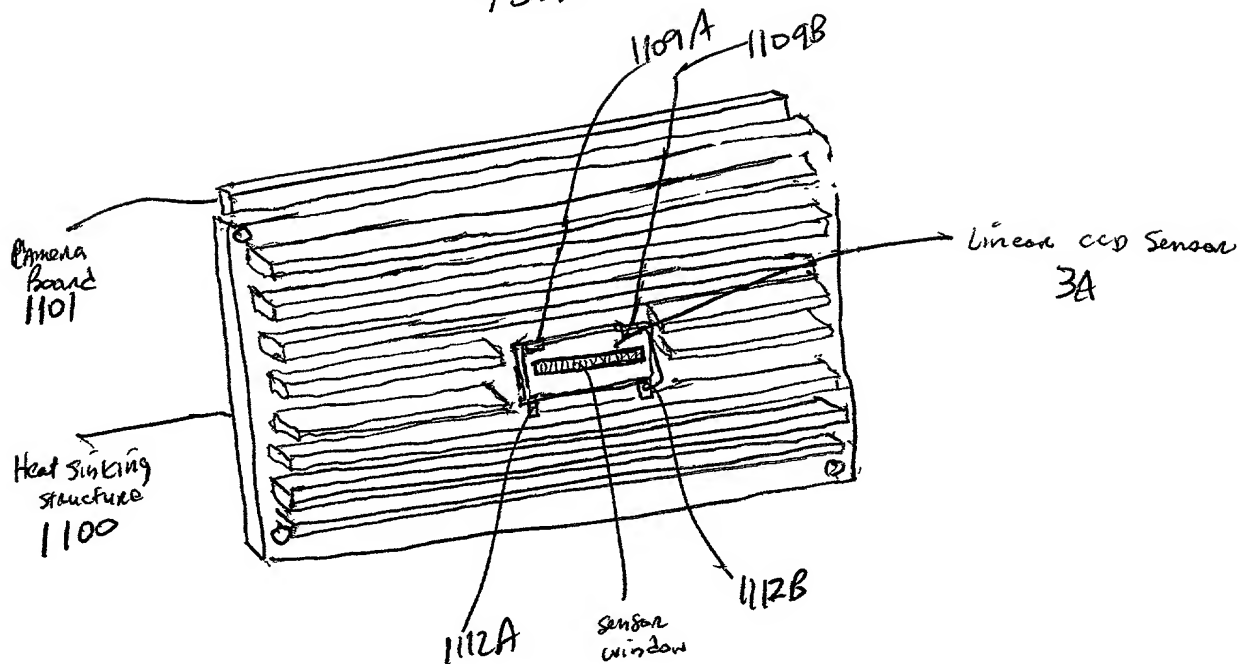


FIG. 3D4

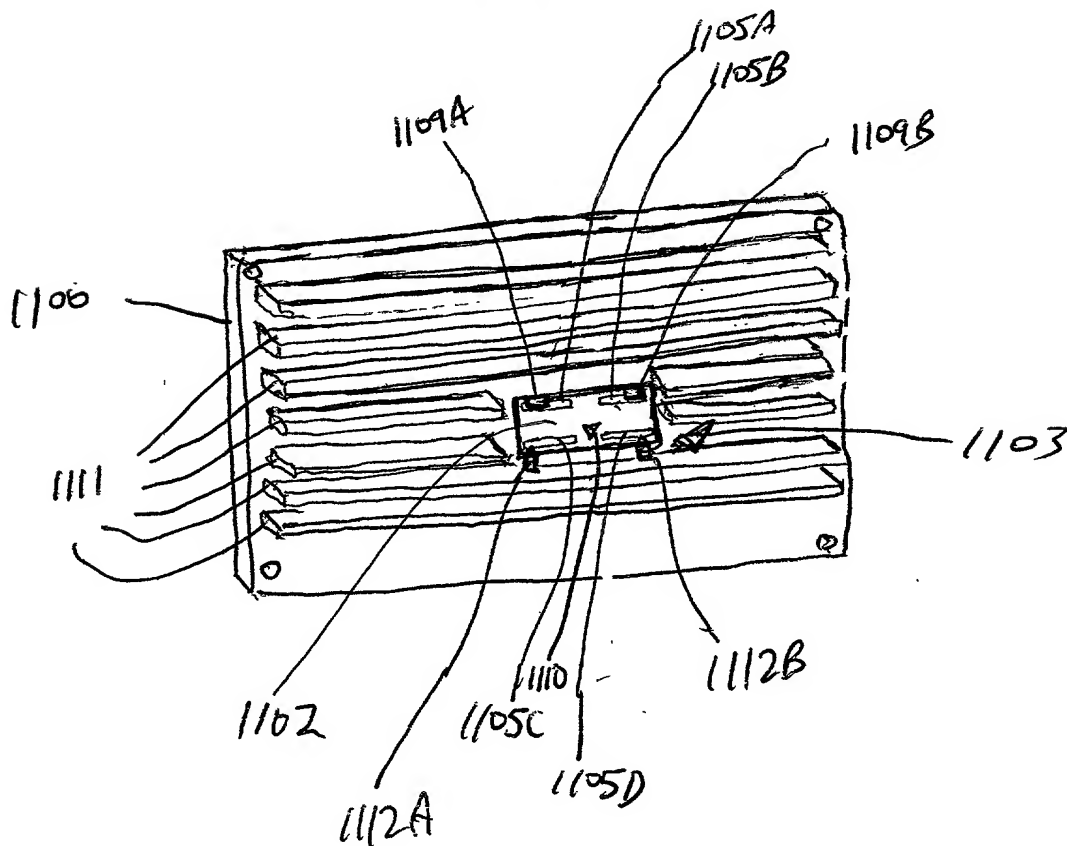


FIG. 3D5

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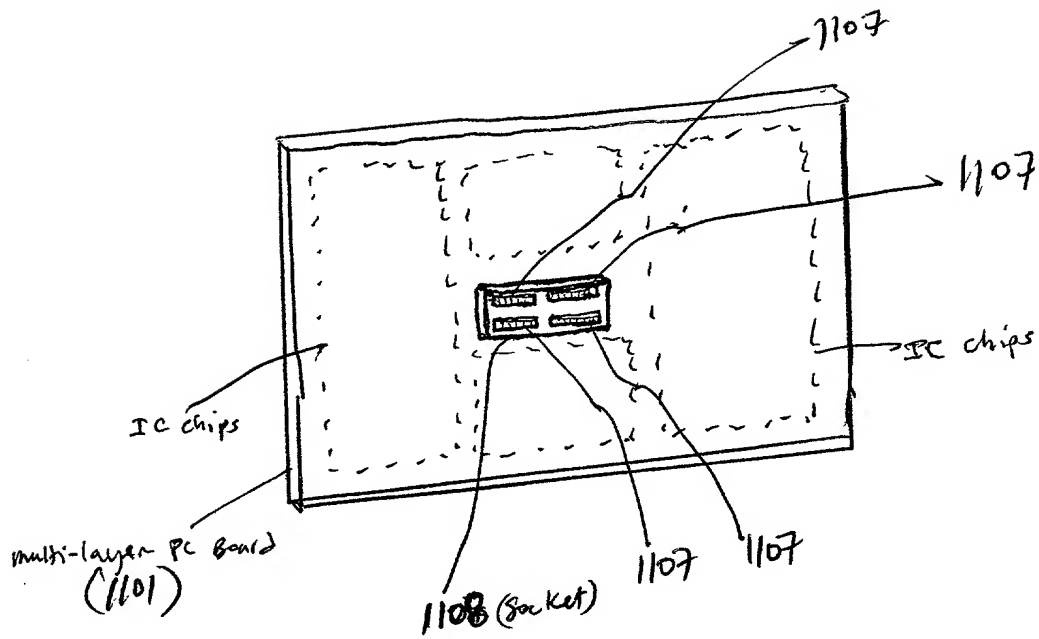


FIG. 3D6

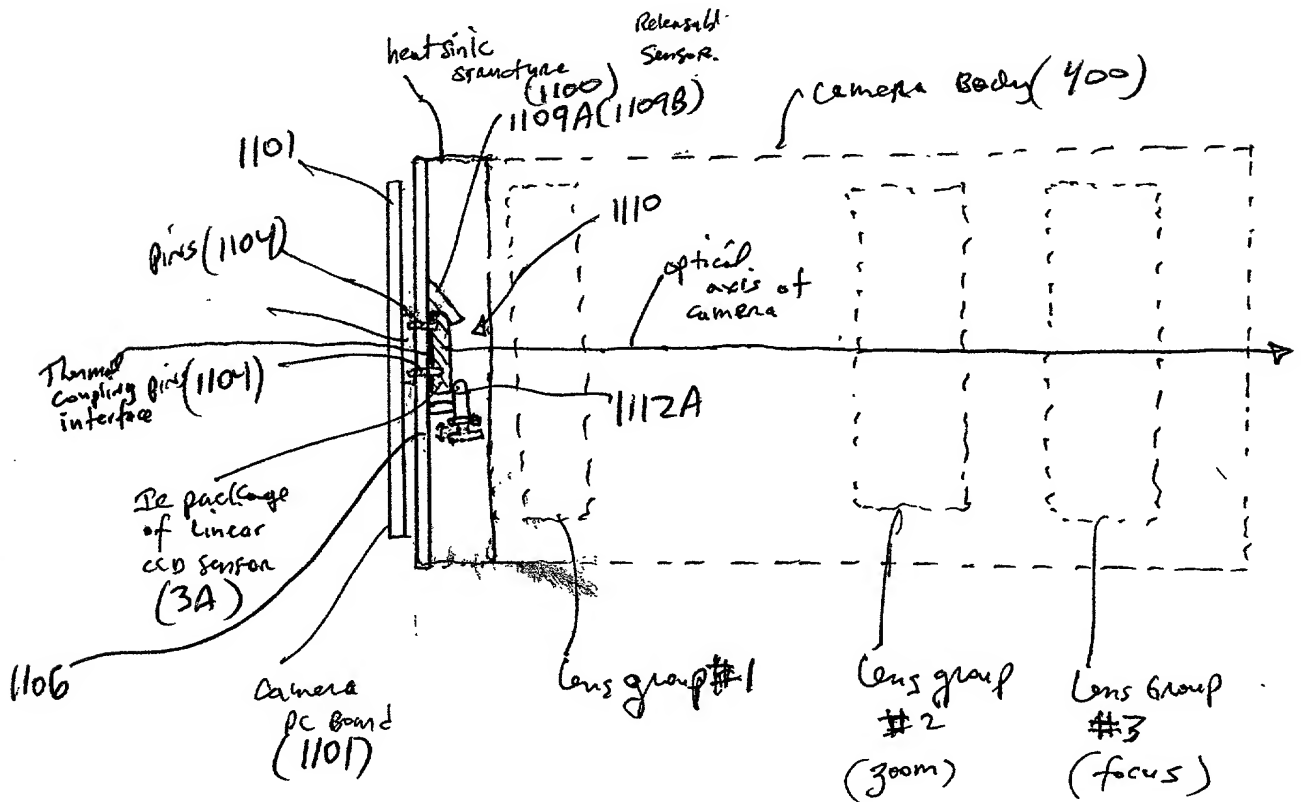
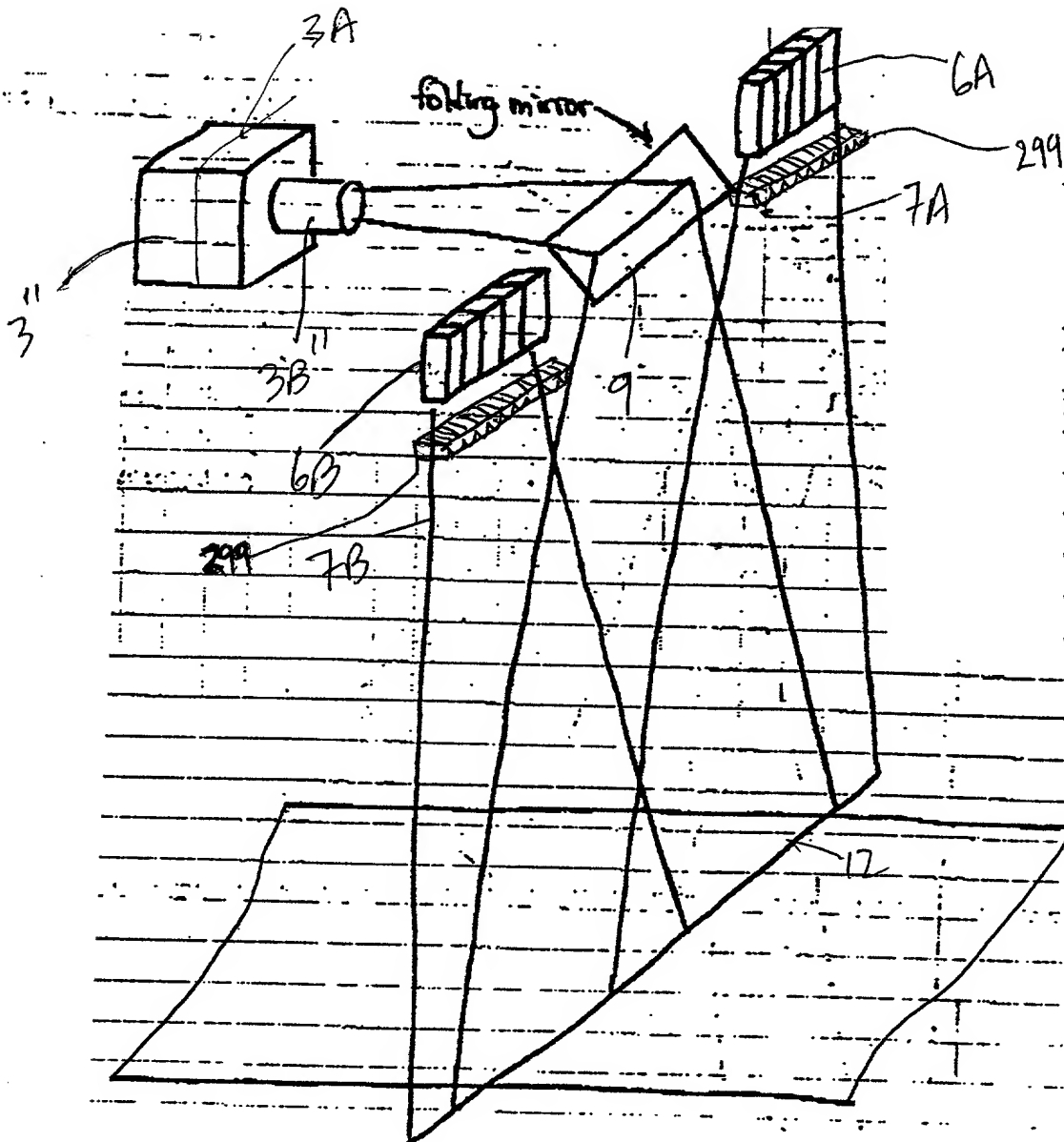


FIG. 3D7

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503

FIG. 3E1

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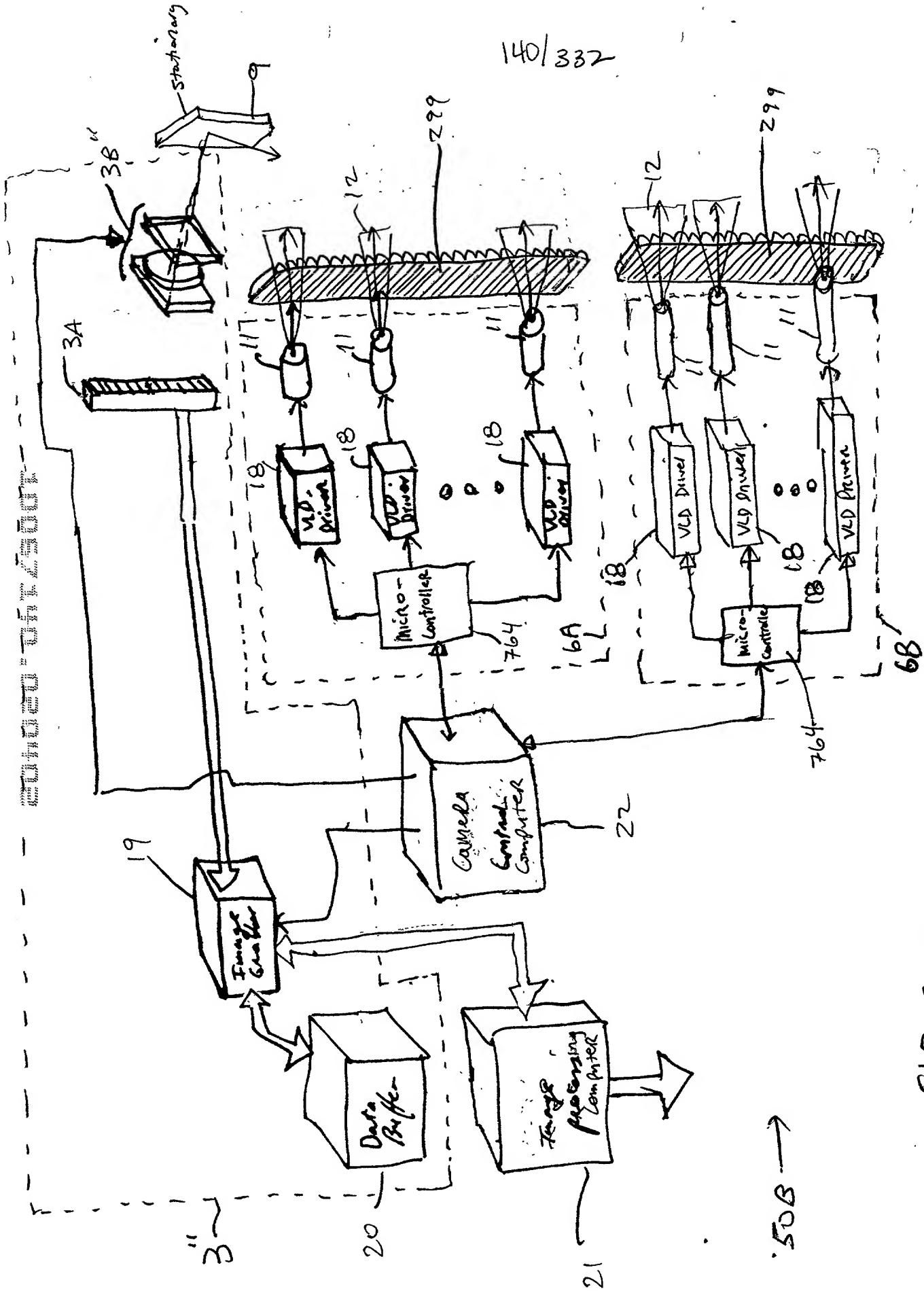
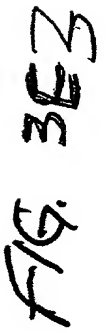


FIG. 3E2

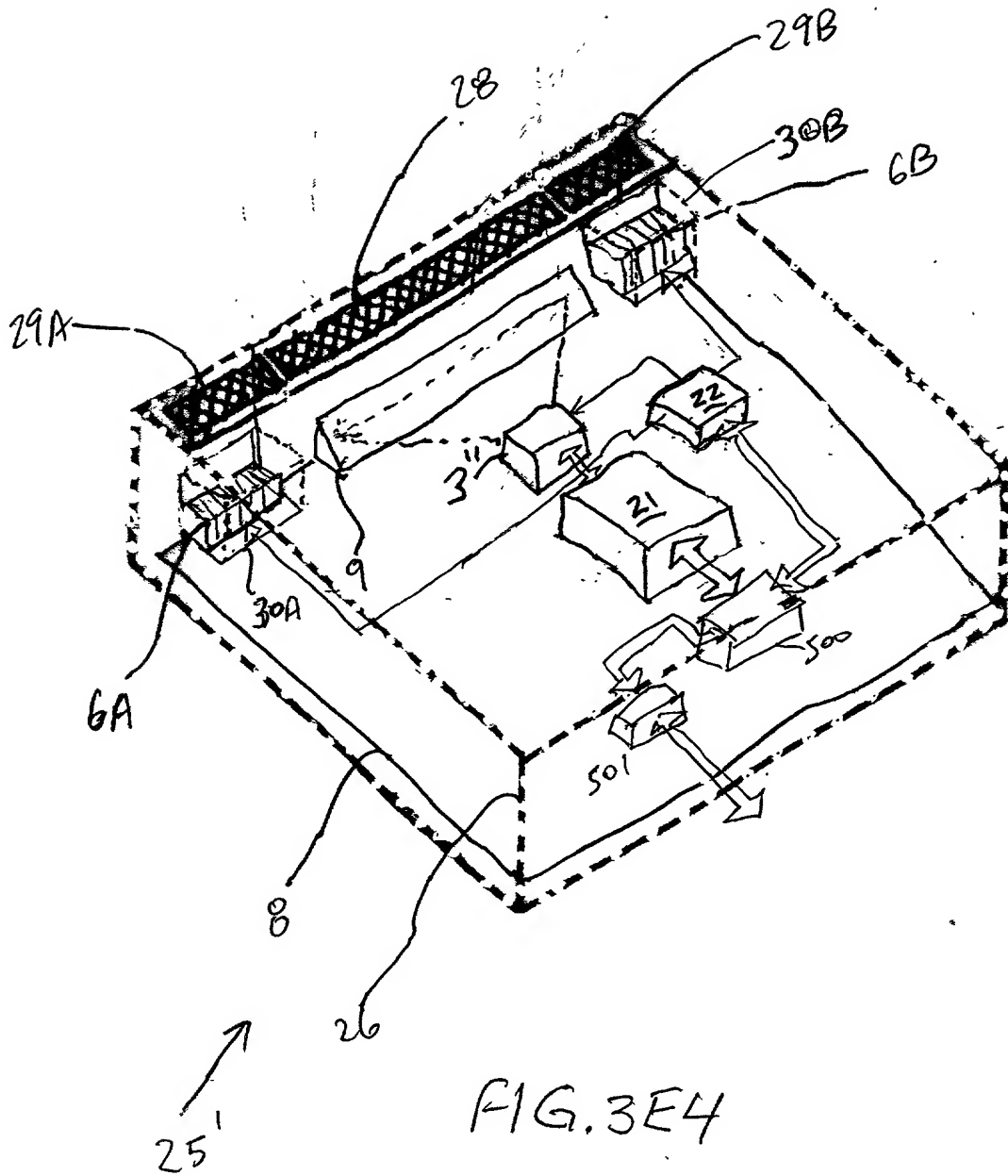
50B →

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142 | 332



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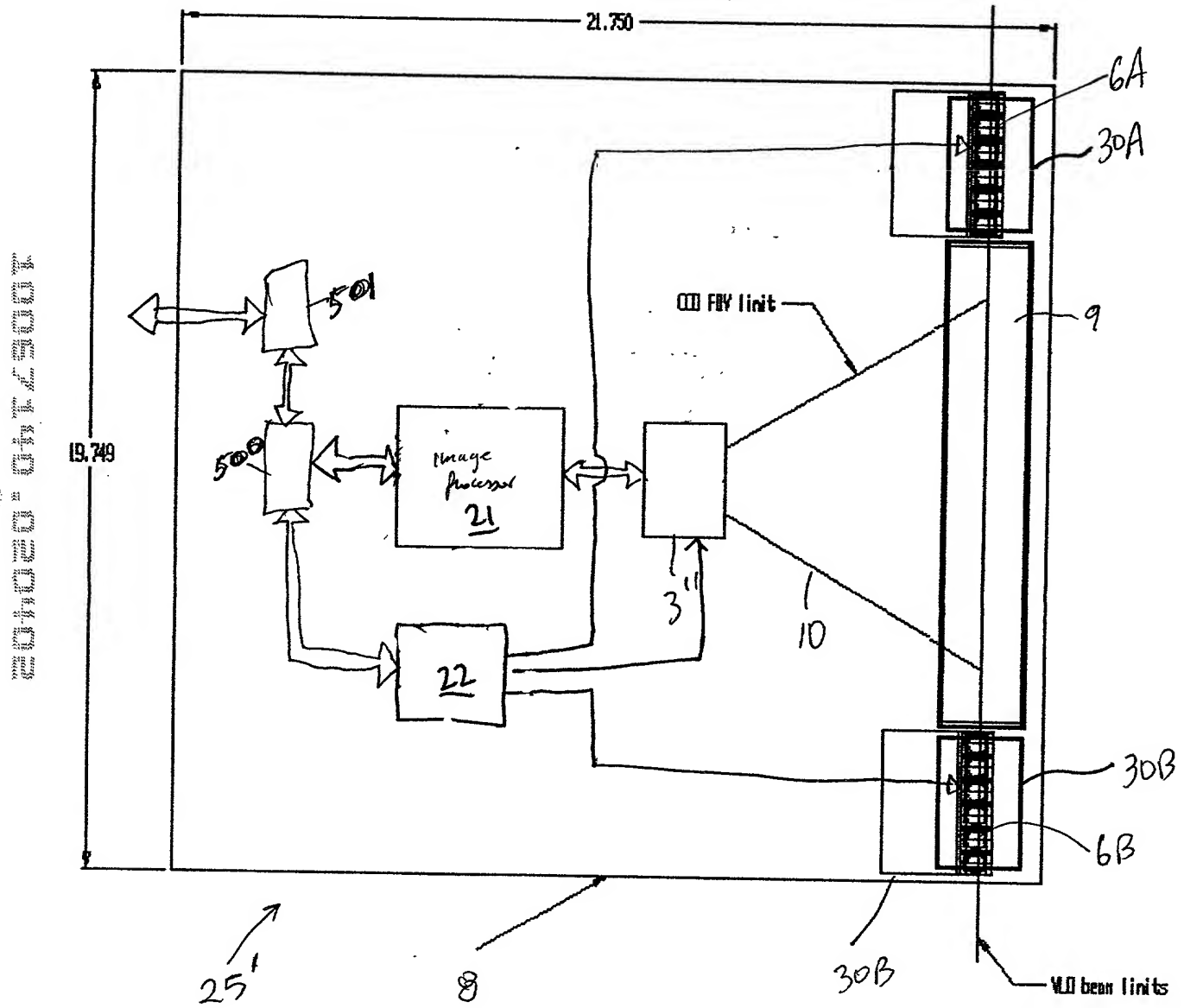


FIG. 3E5

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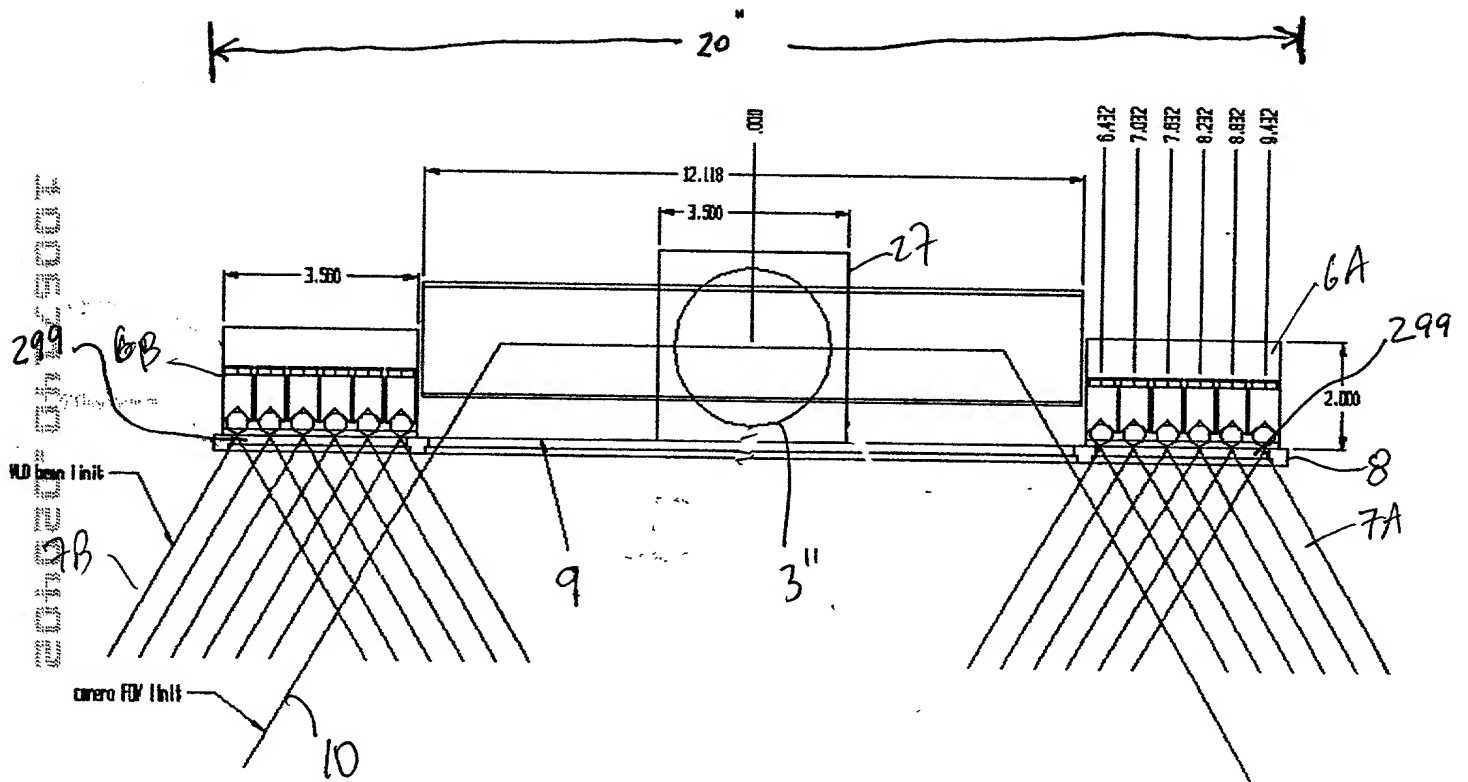


FIG. 3E6

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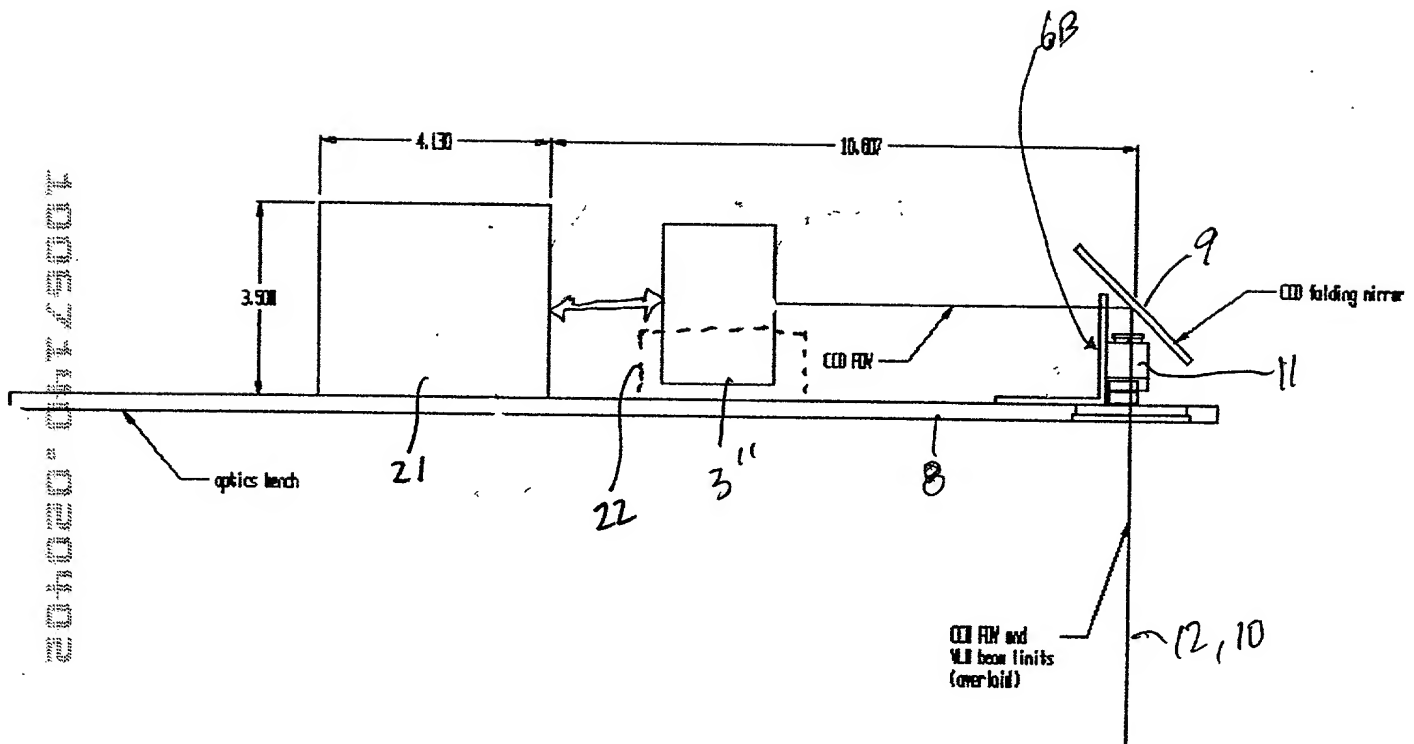


FIG. 3E7

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\*Variable FOV

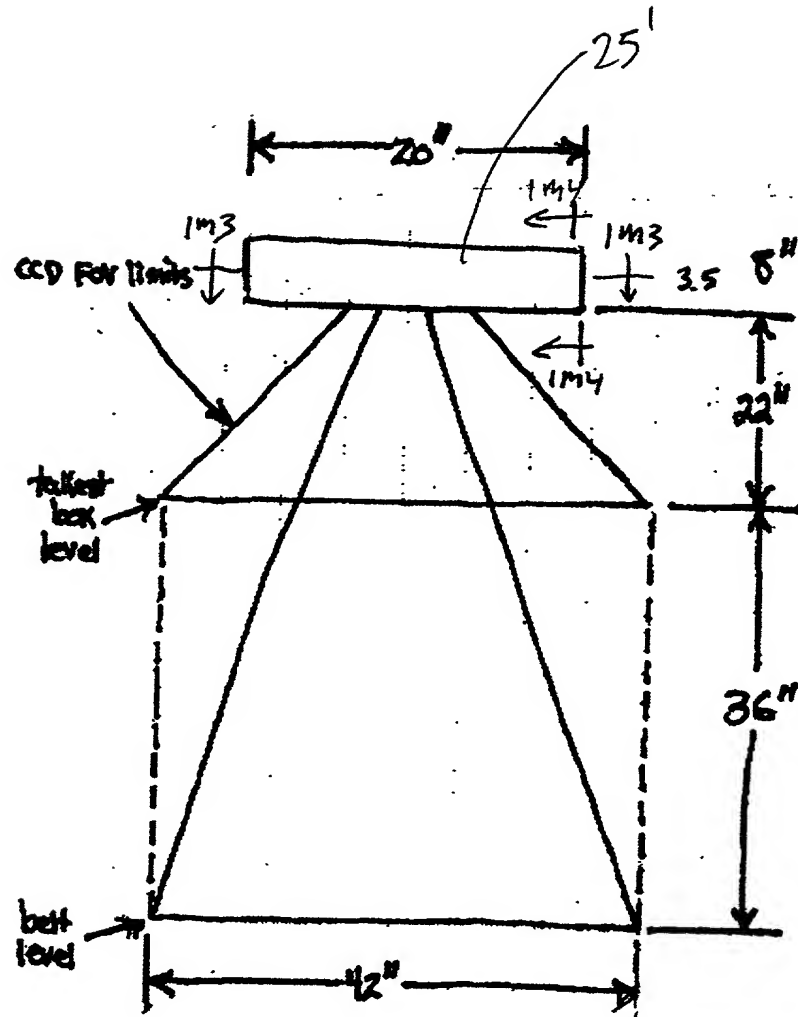


FIG. 3E8

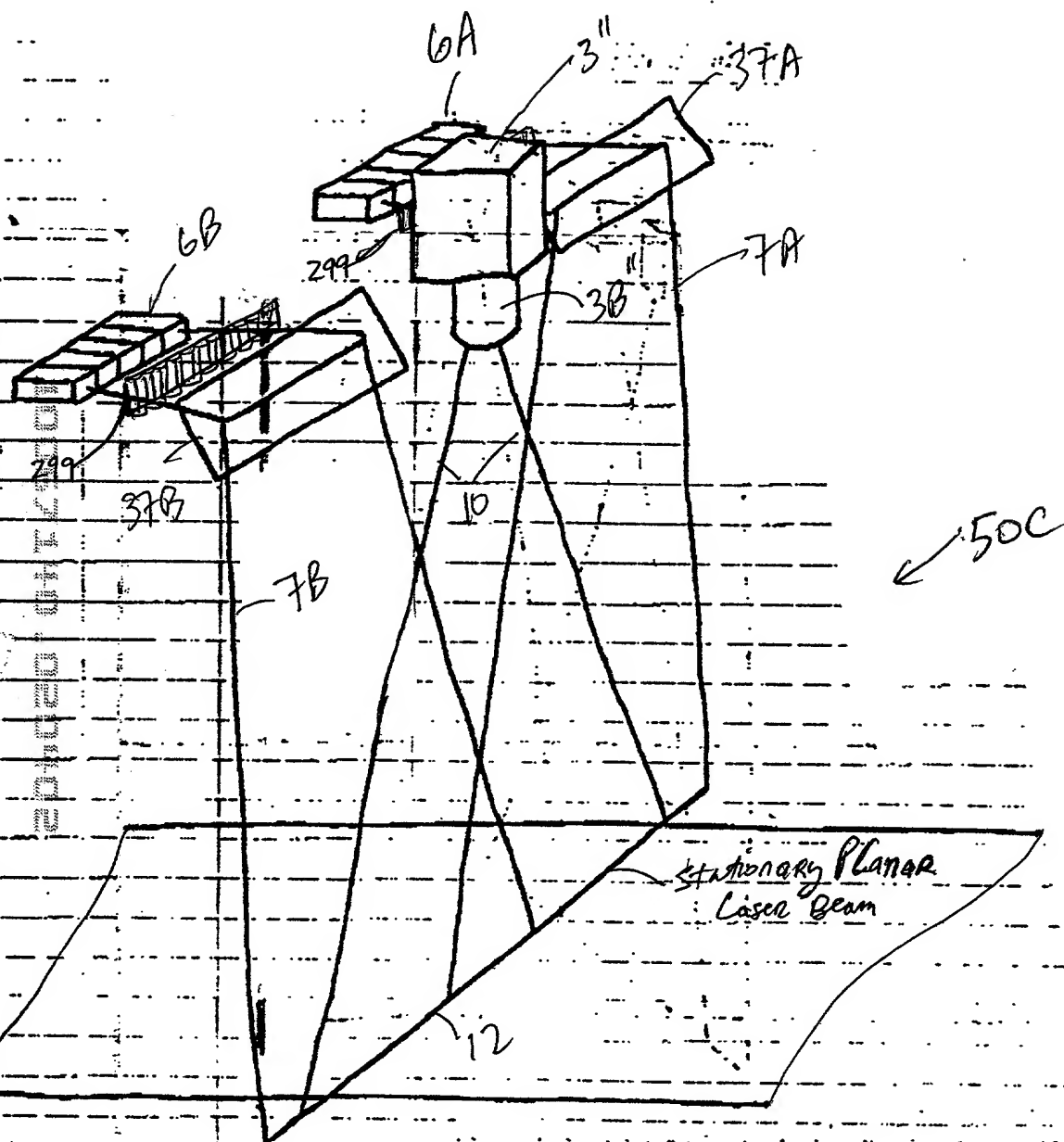
$$147/332$$


FIG. 3F1

$$148/332$$






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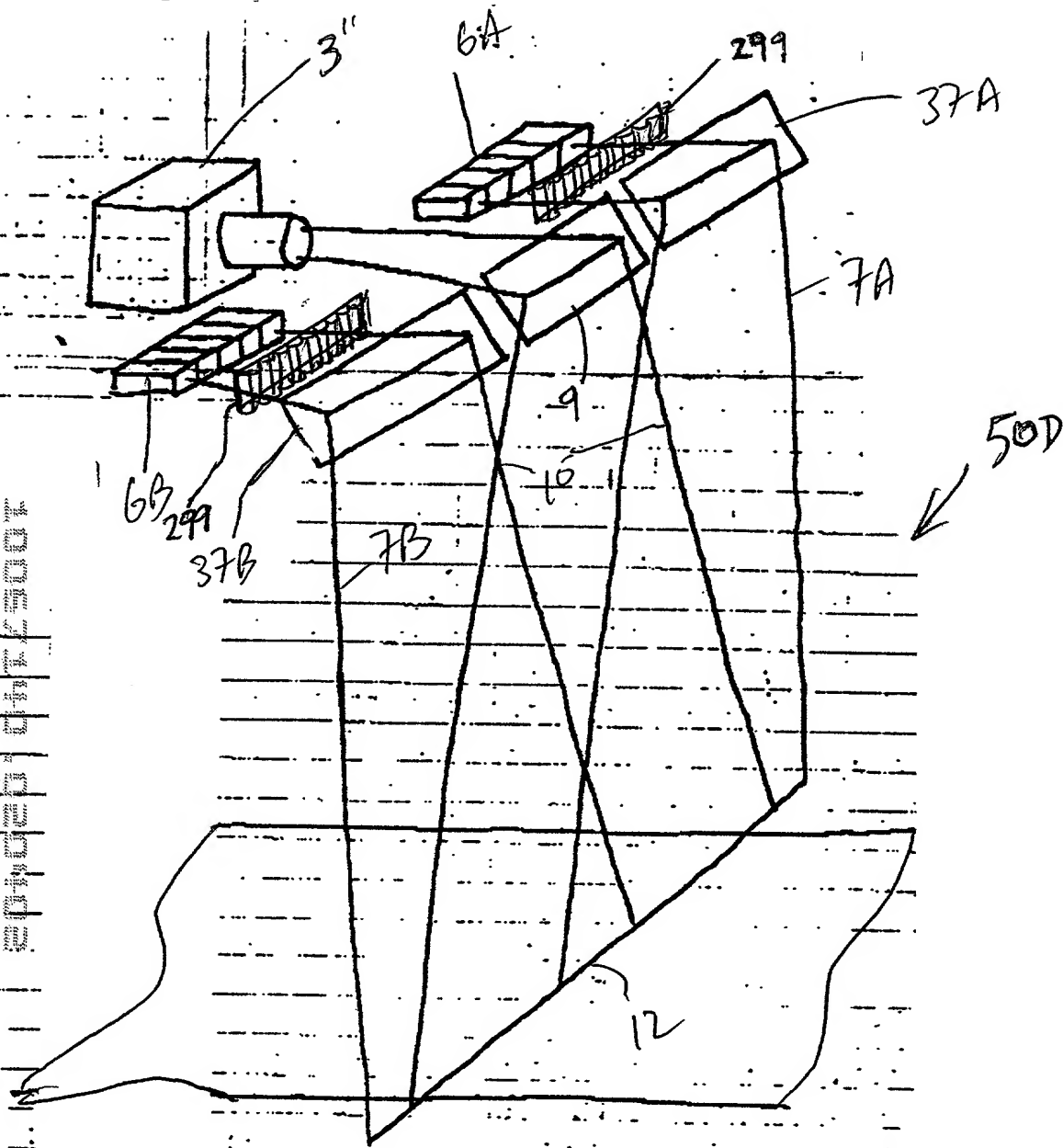


FIG. 3G1

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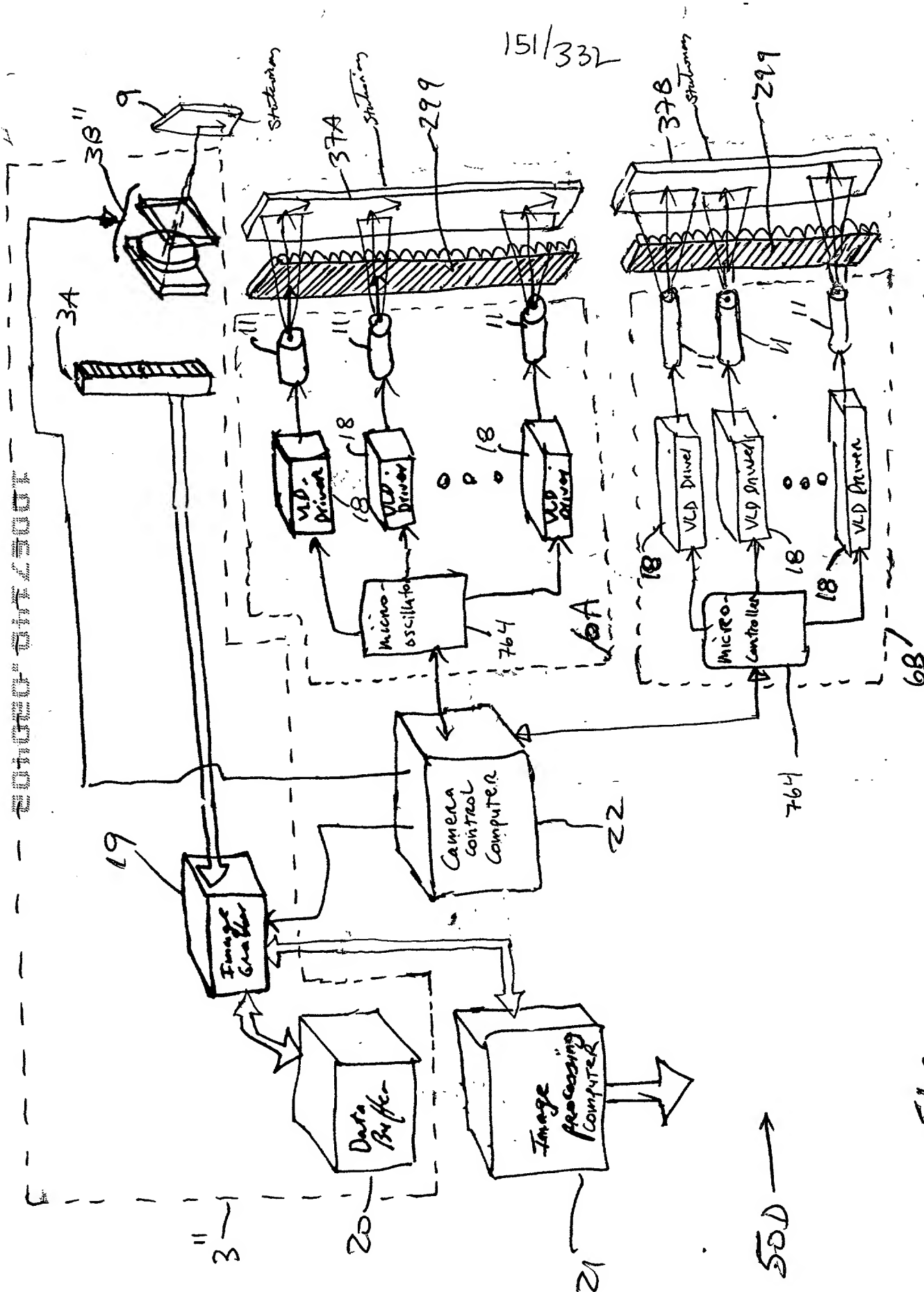


FIG. 392

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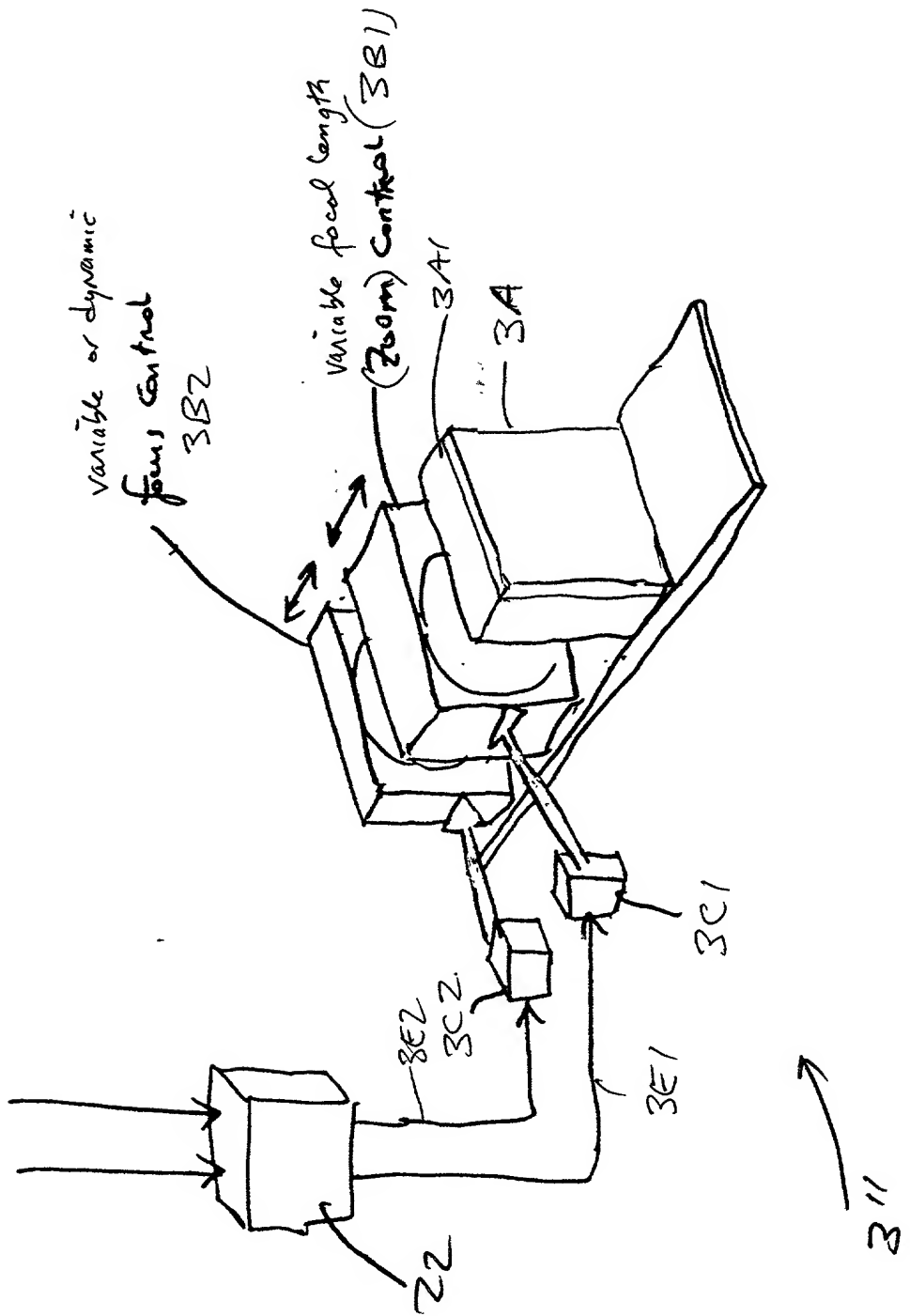


FIG. 3G3

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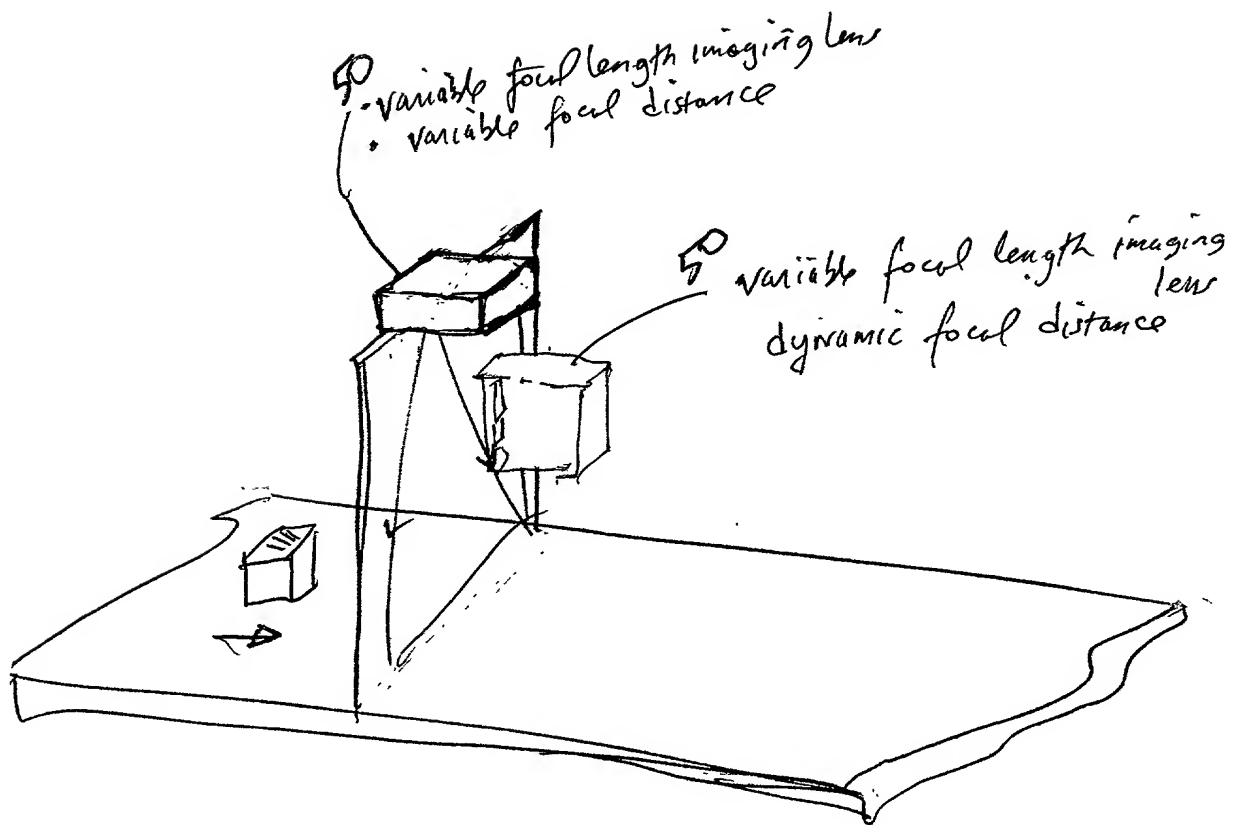


FIG. 3H



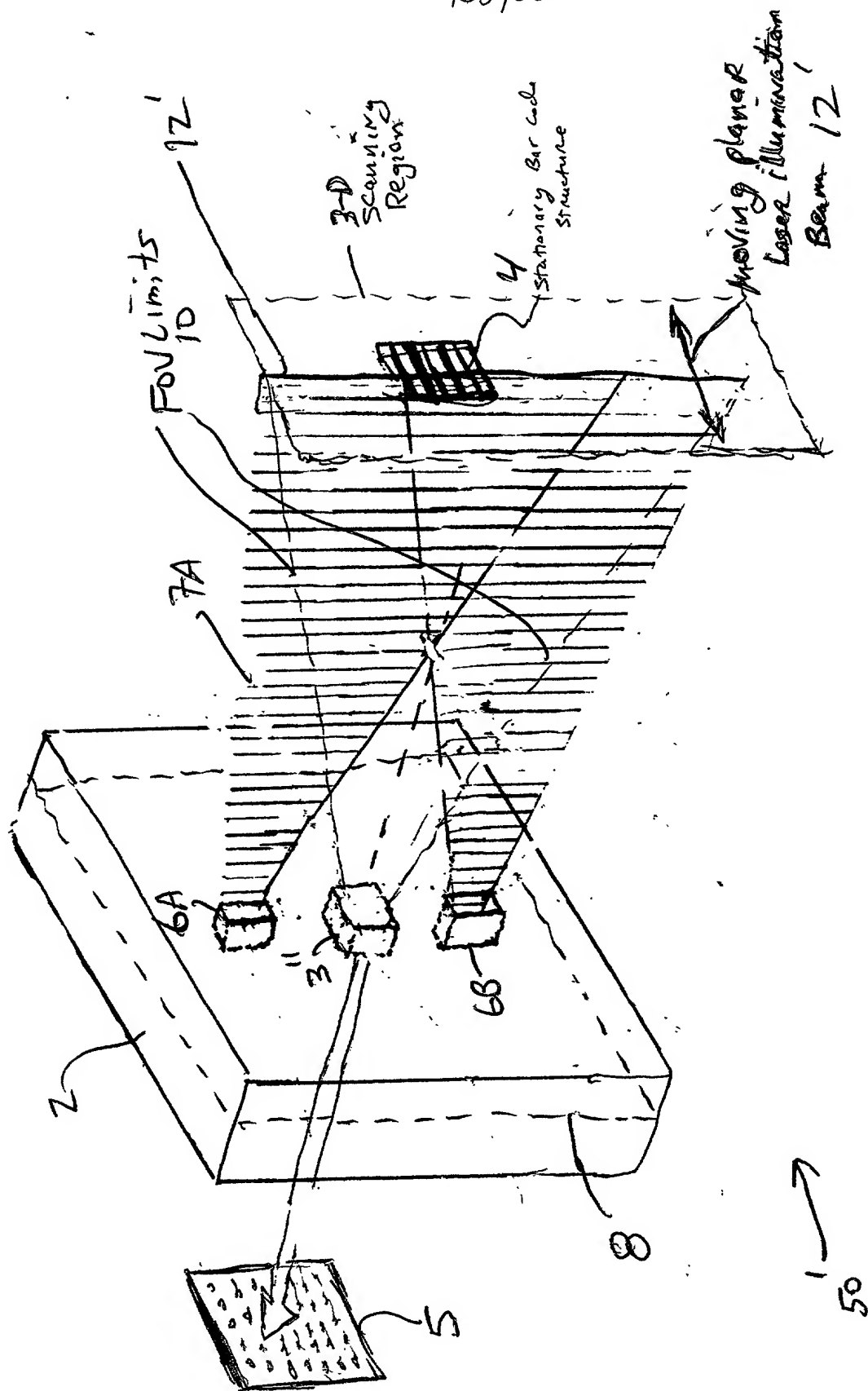


FIG. 3J1

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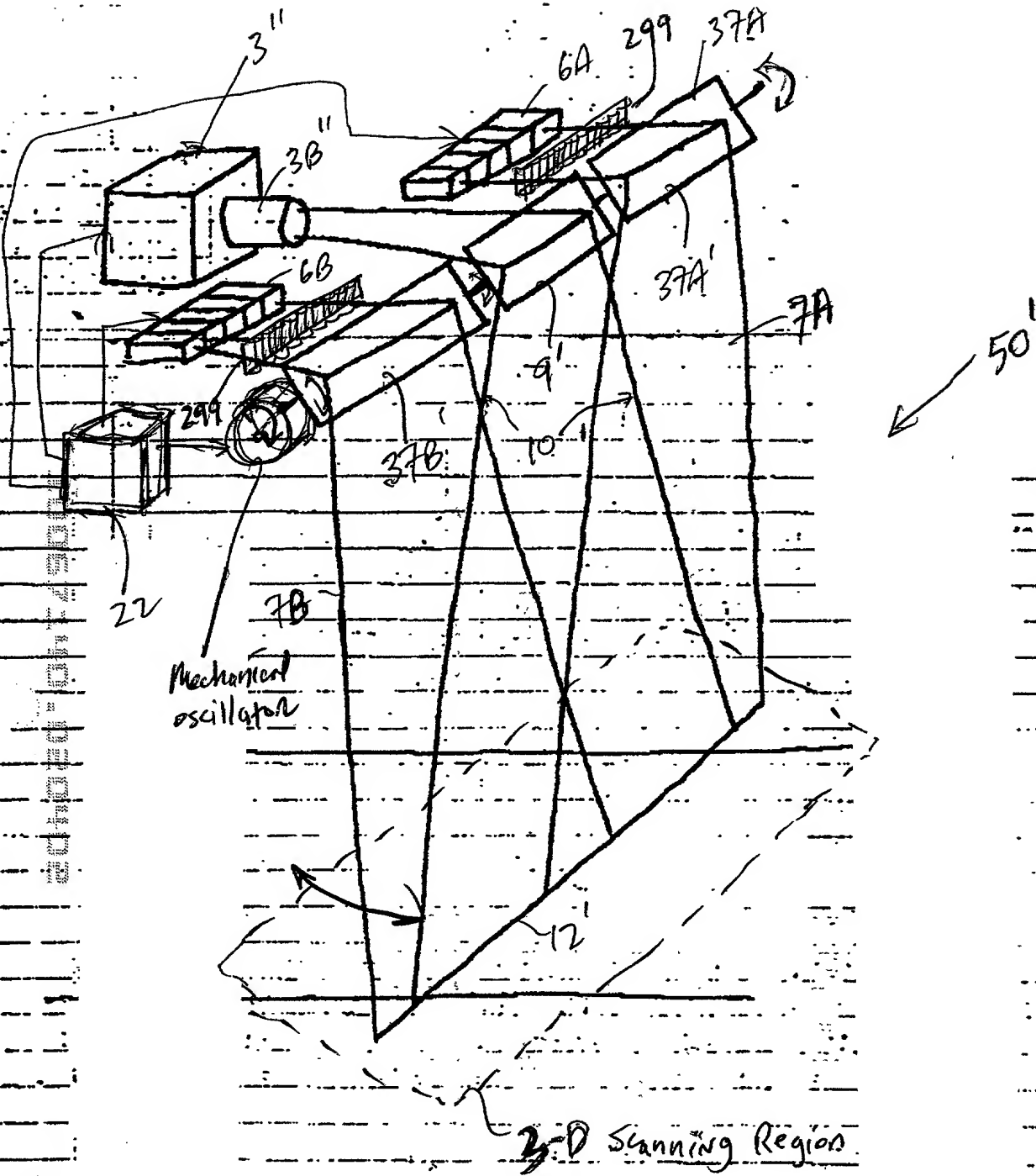
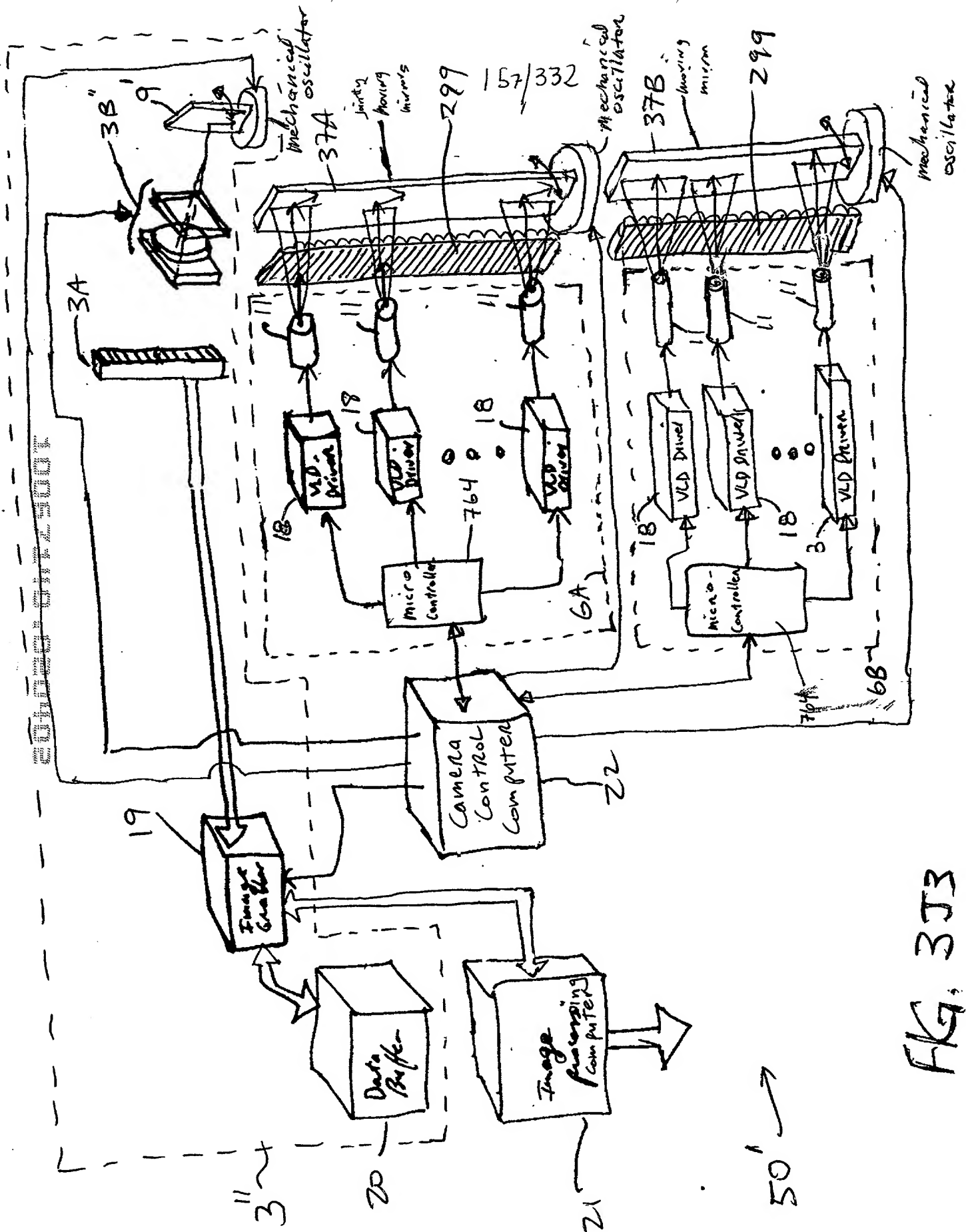


FIG 3J2



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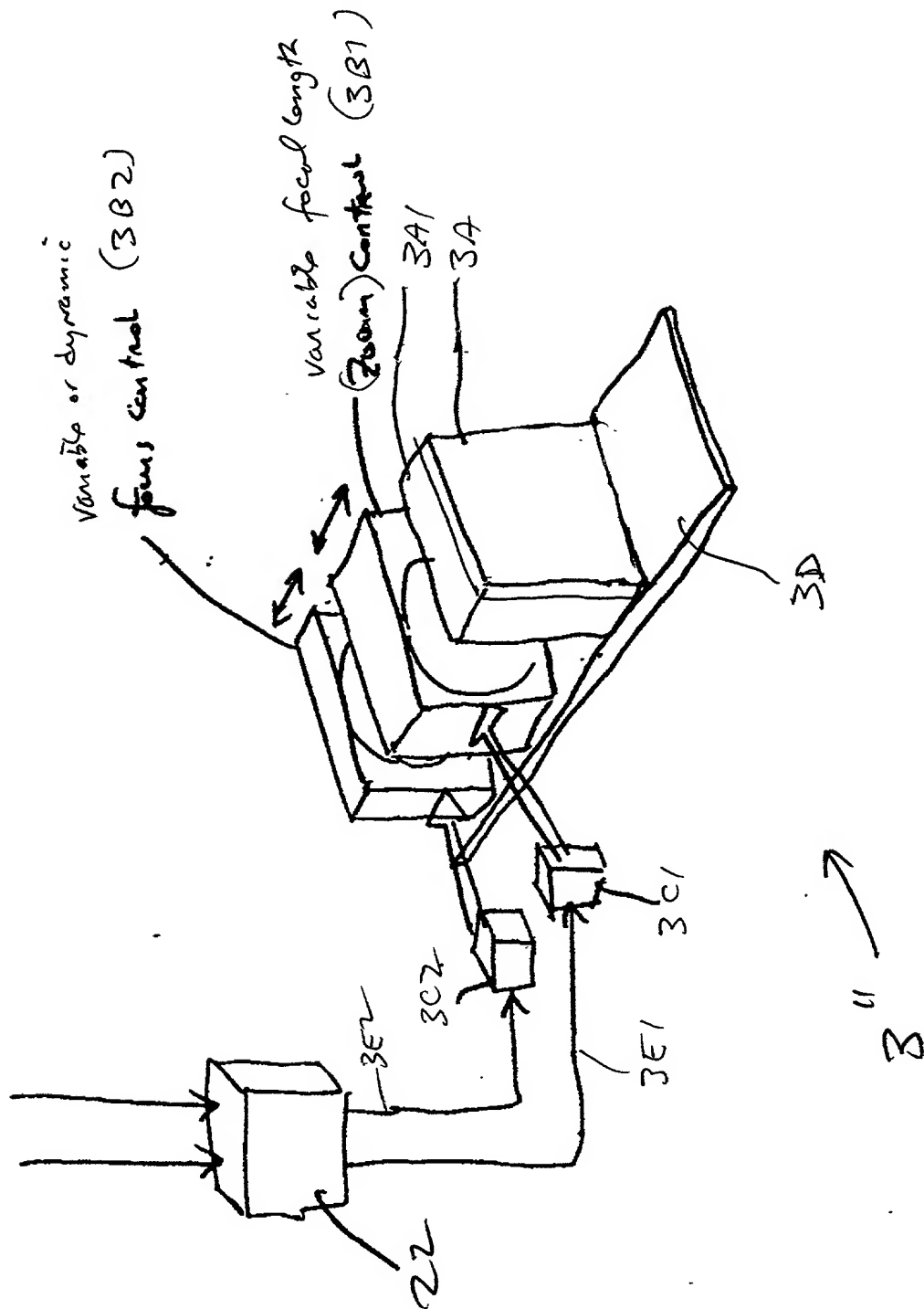


FIG. 3J4

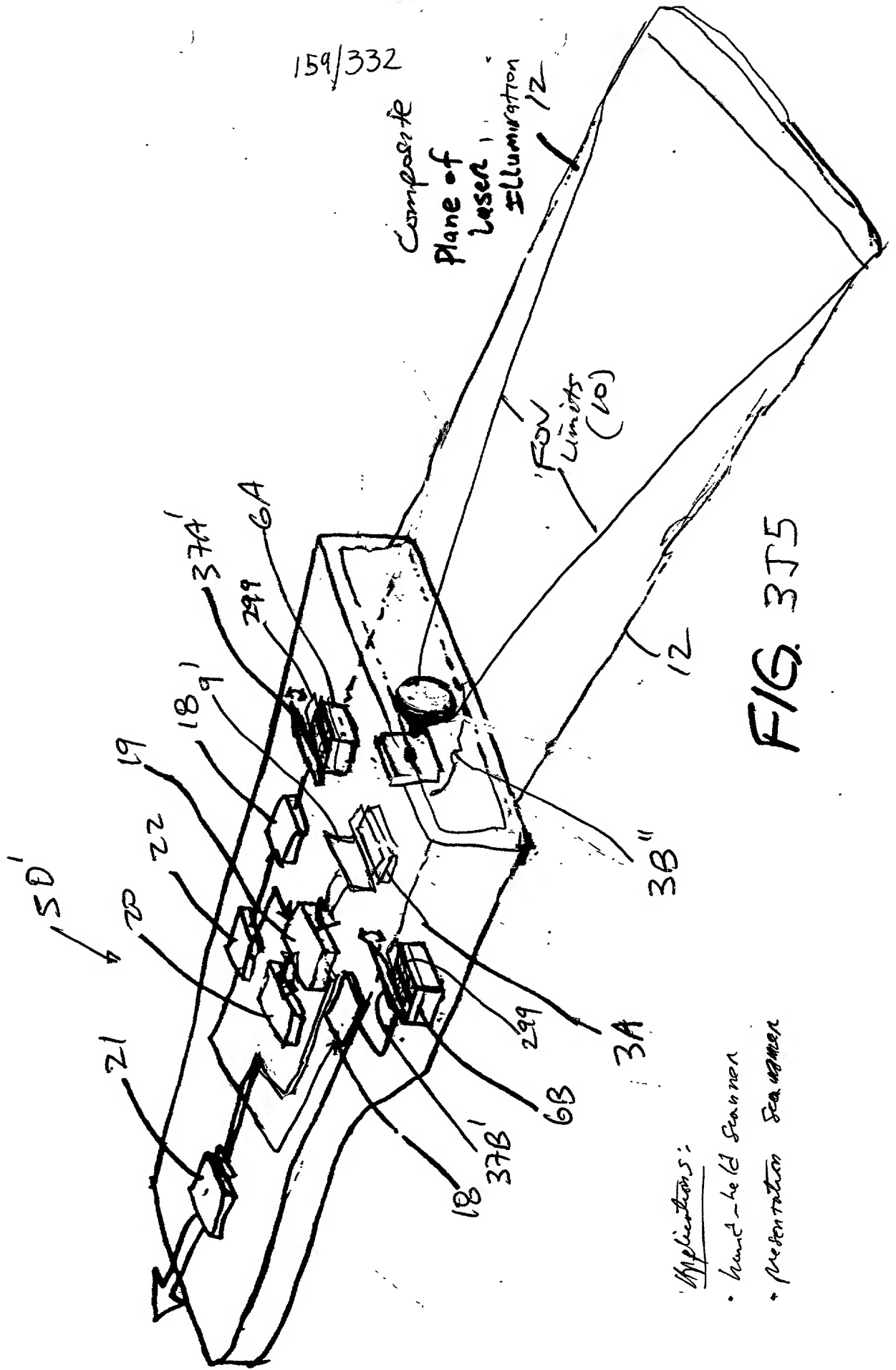


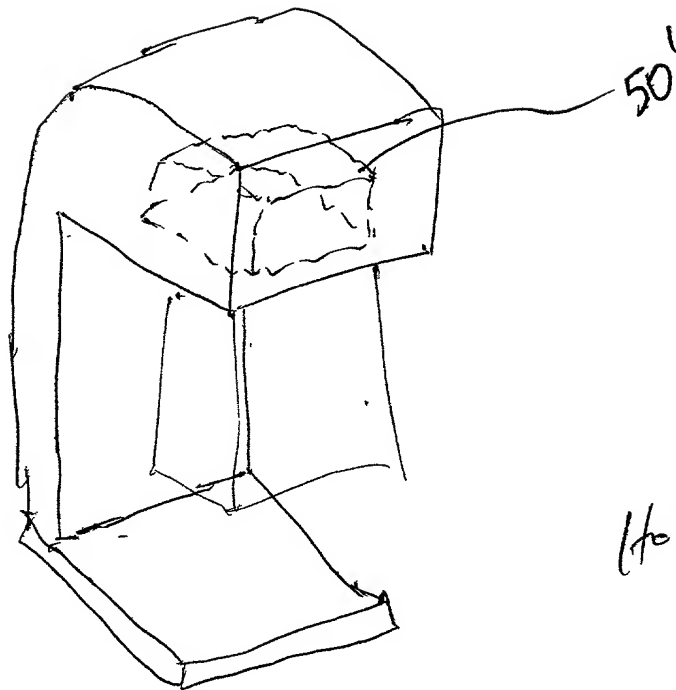
FIG. 3J5

Applications:

- Hand-held Scanner
- Presentation Scanner

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2-D  
Hold-under  
Scanner

FIG-3J6

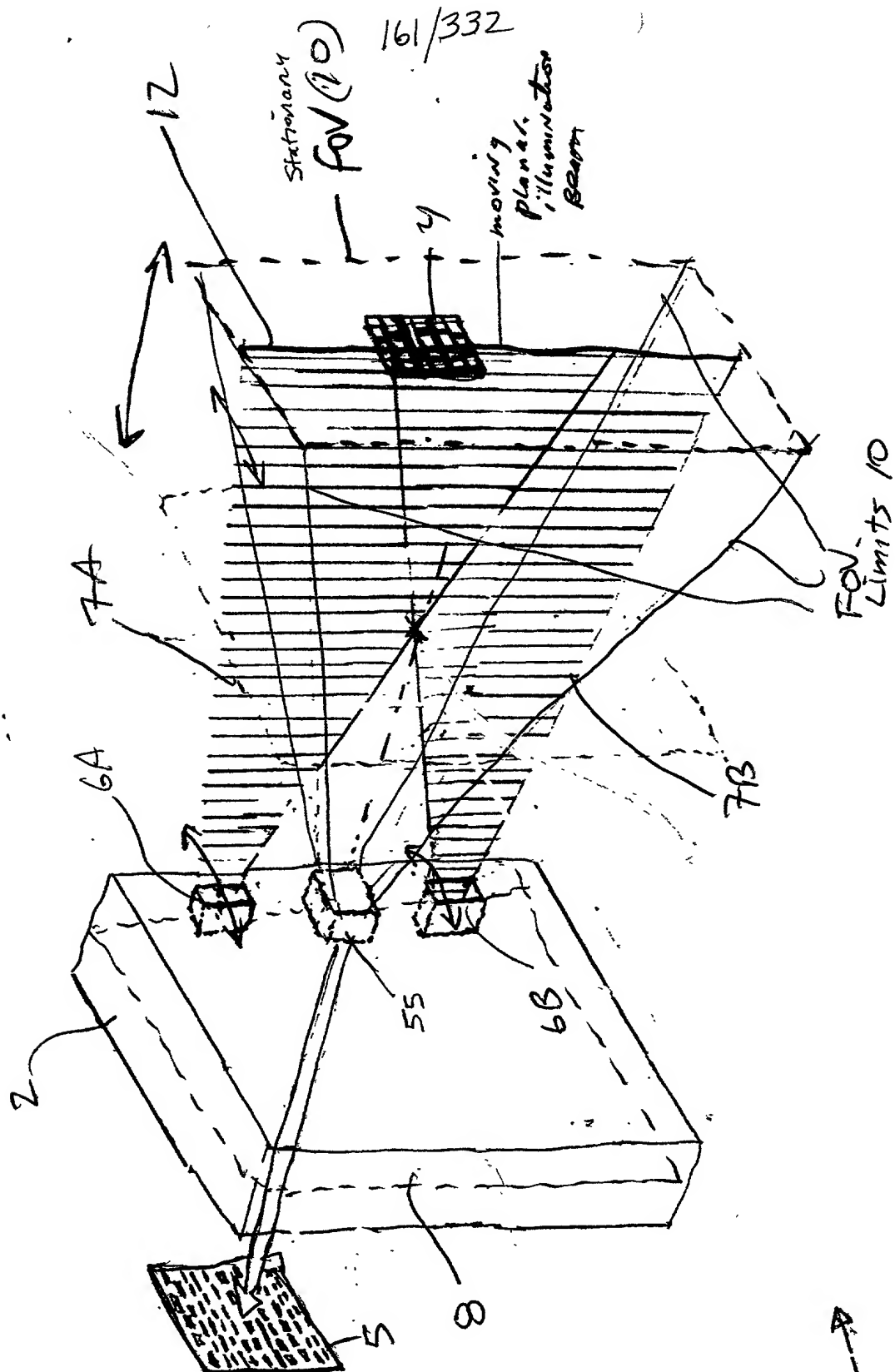


FIG 4A

60 →

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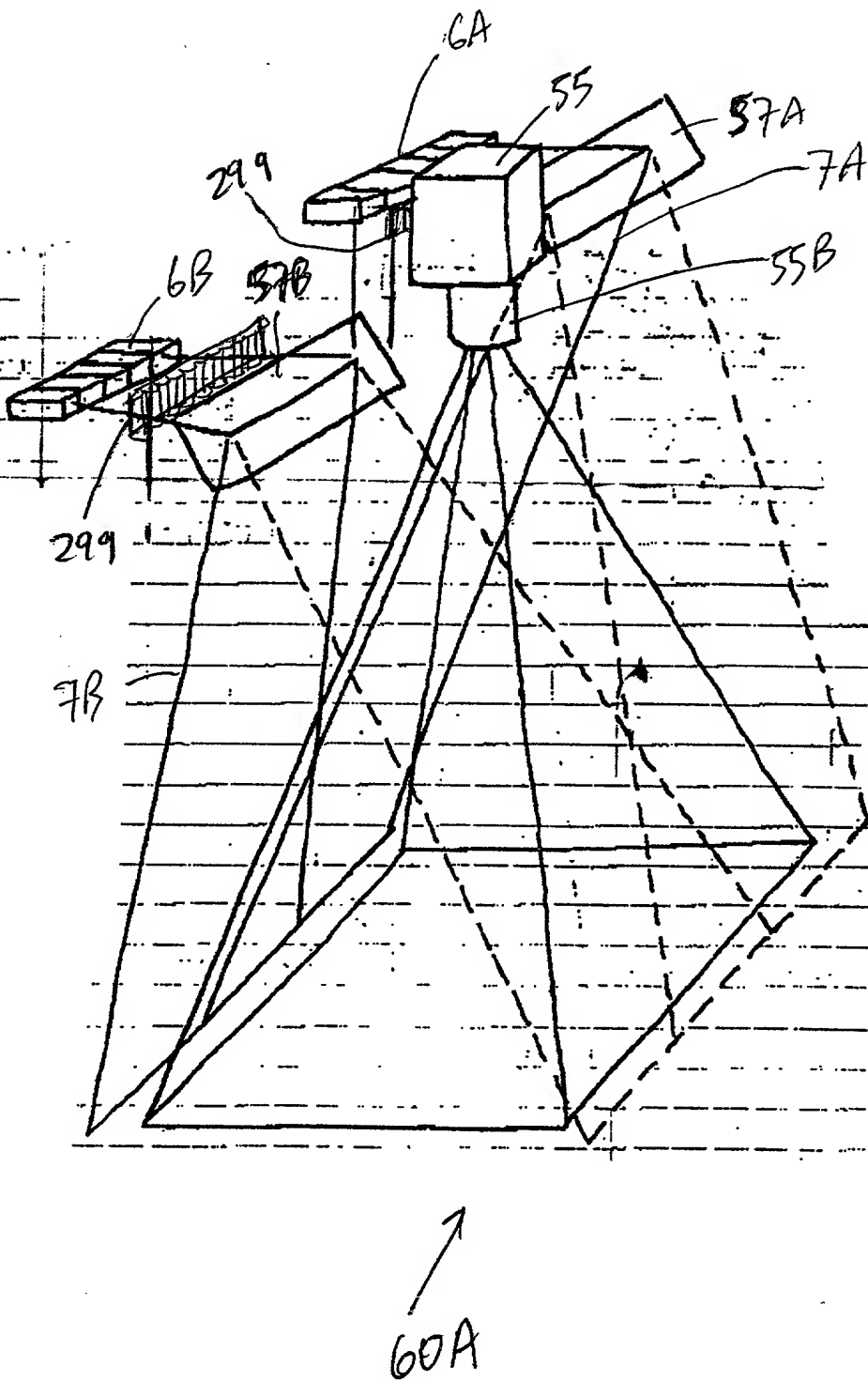


FIG. 4B1

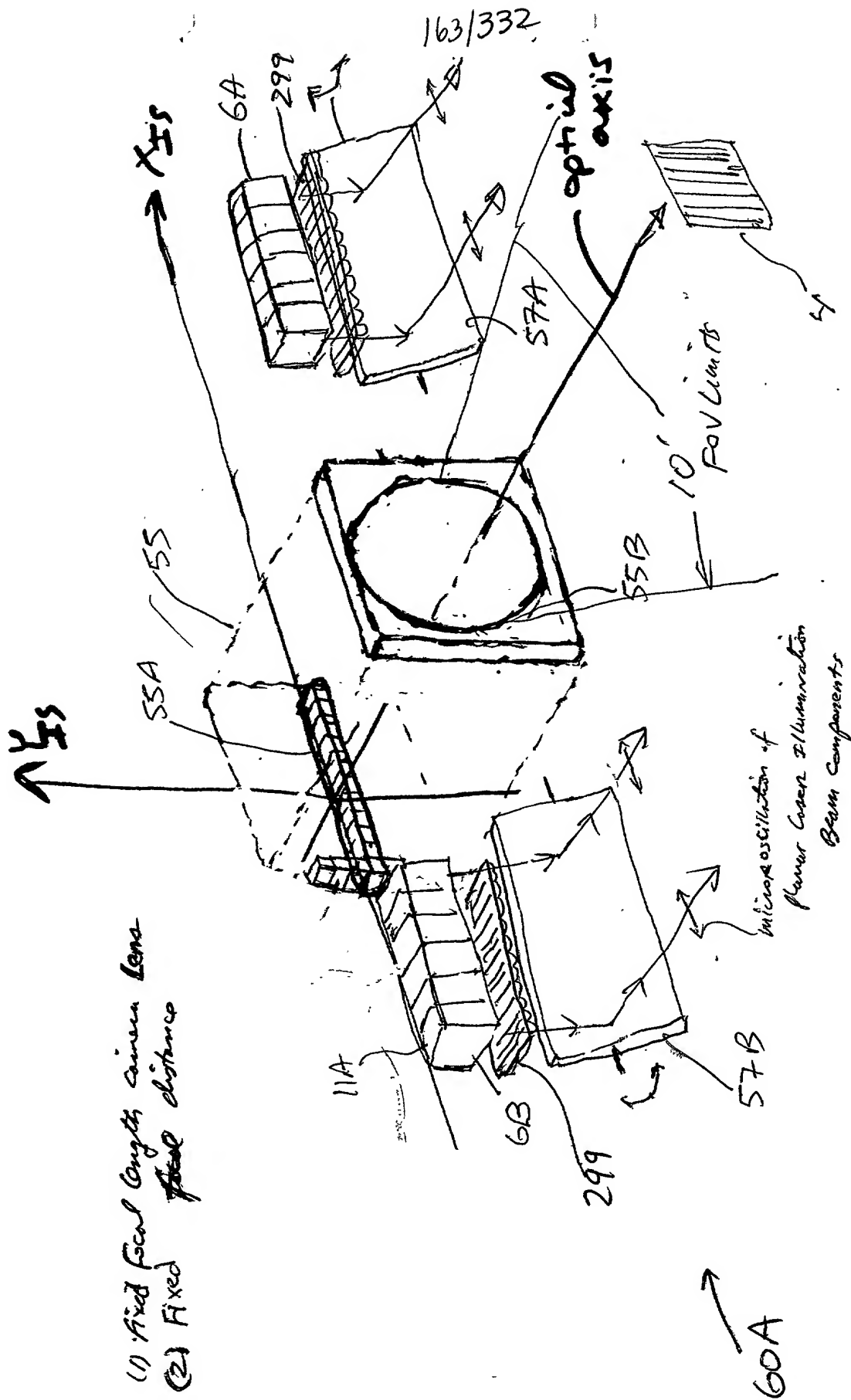


FIG. 4BZ

FIG. 4B3

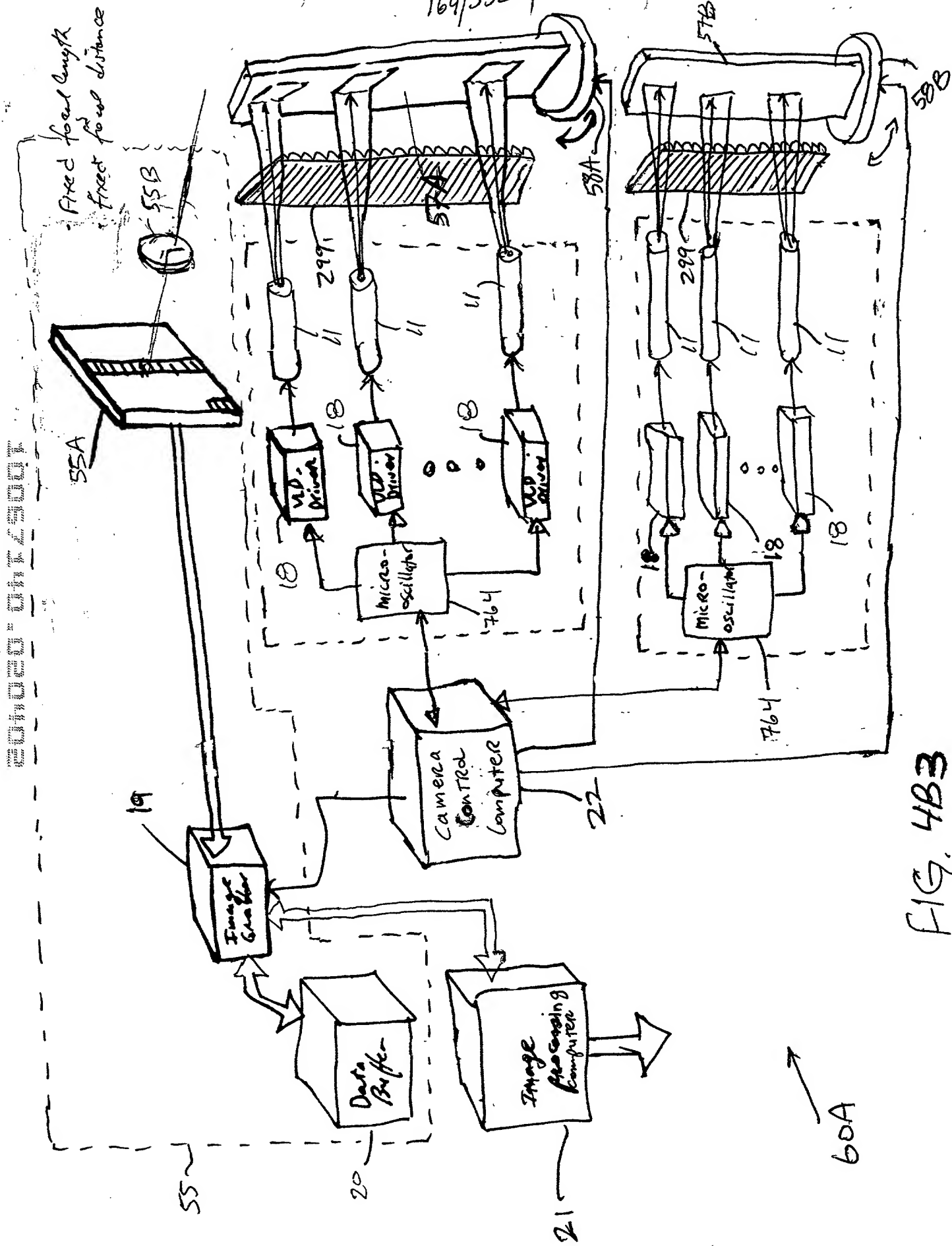


FIG. 4B3

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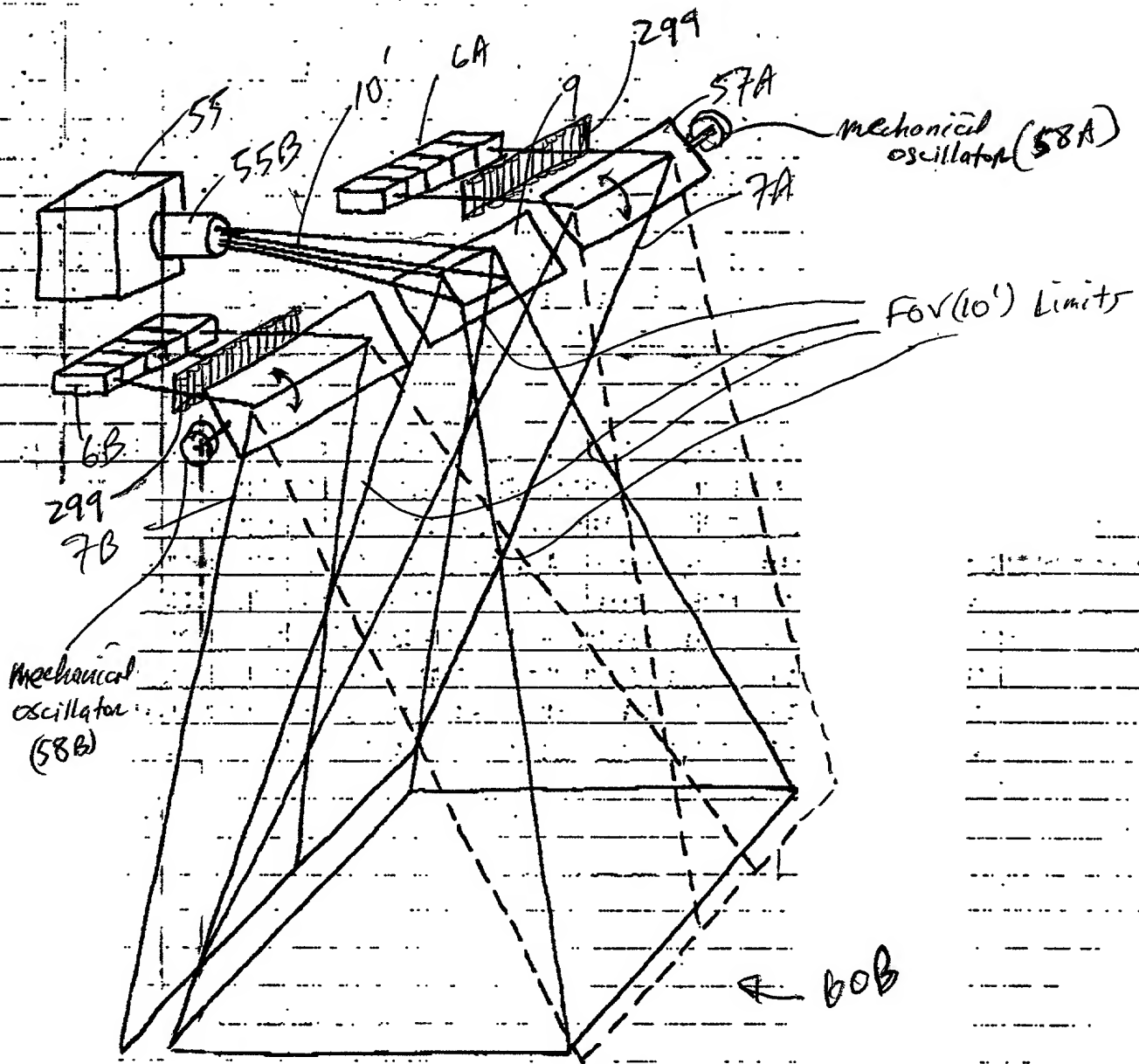


FIG. 4C1



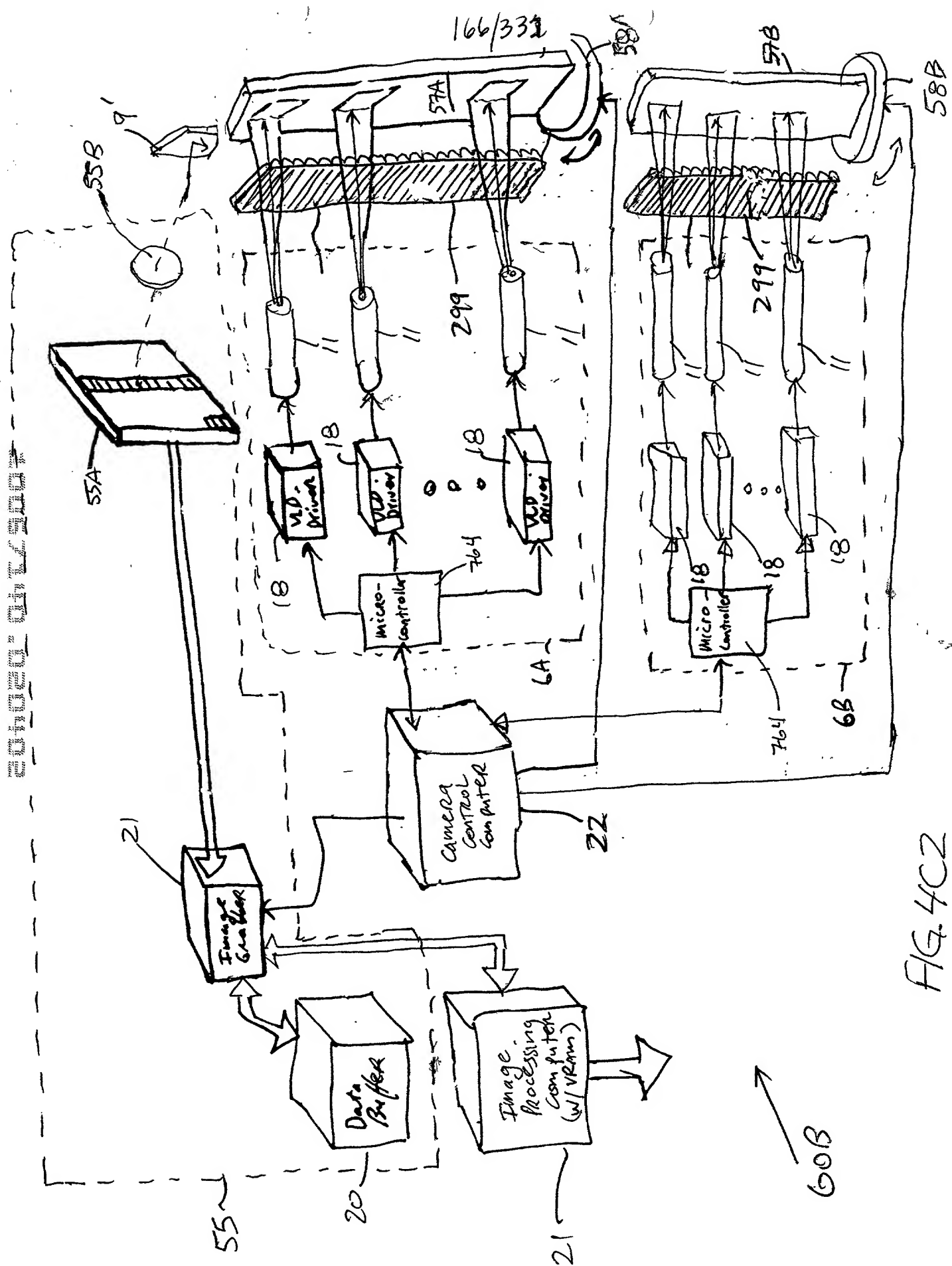


FIG. 4C2

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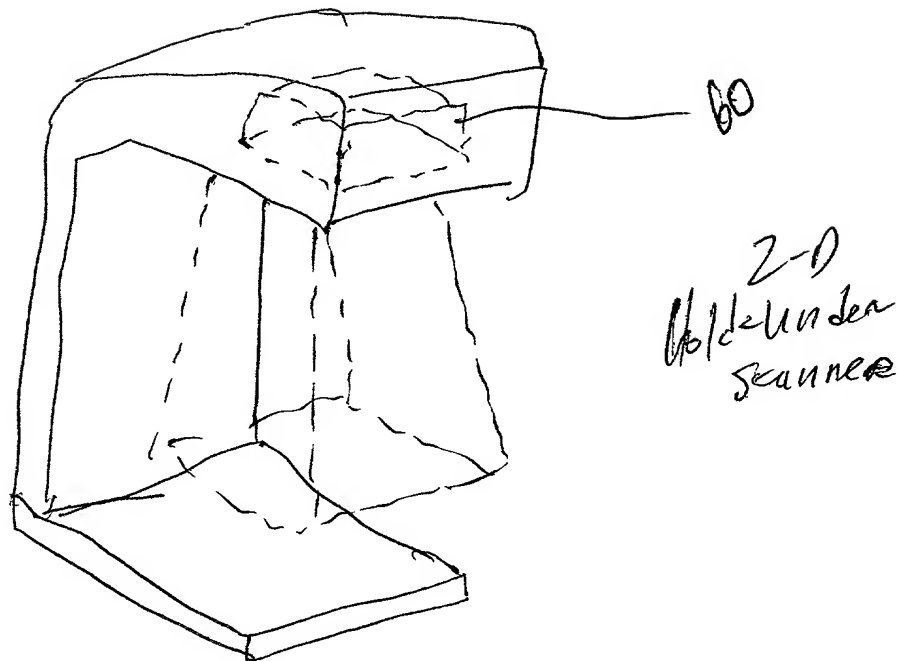


FIG. 4D

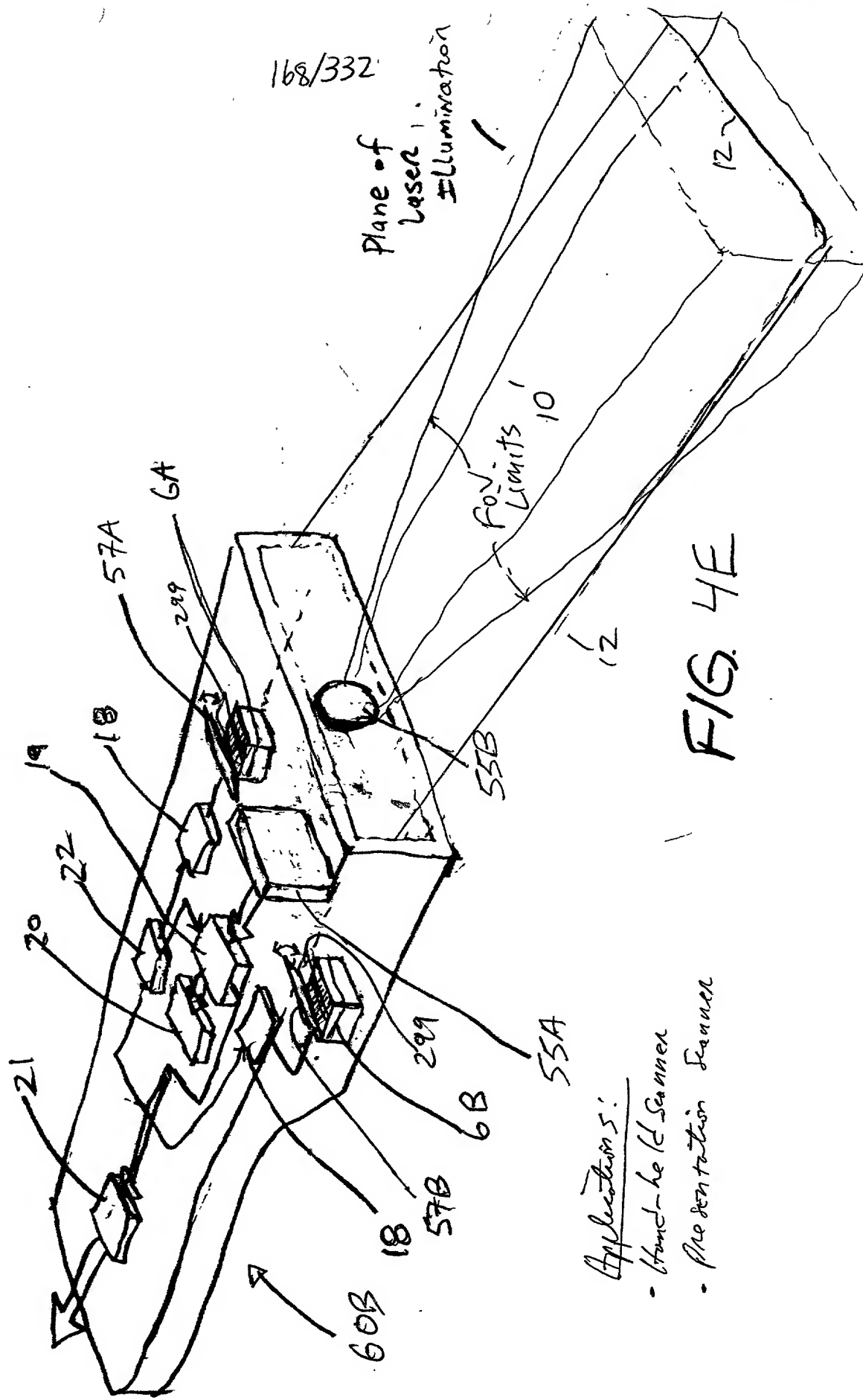
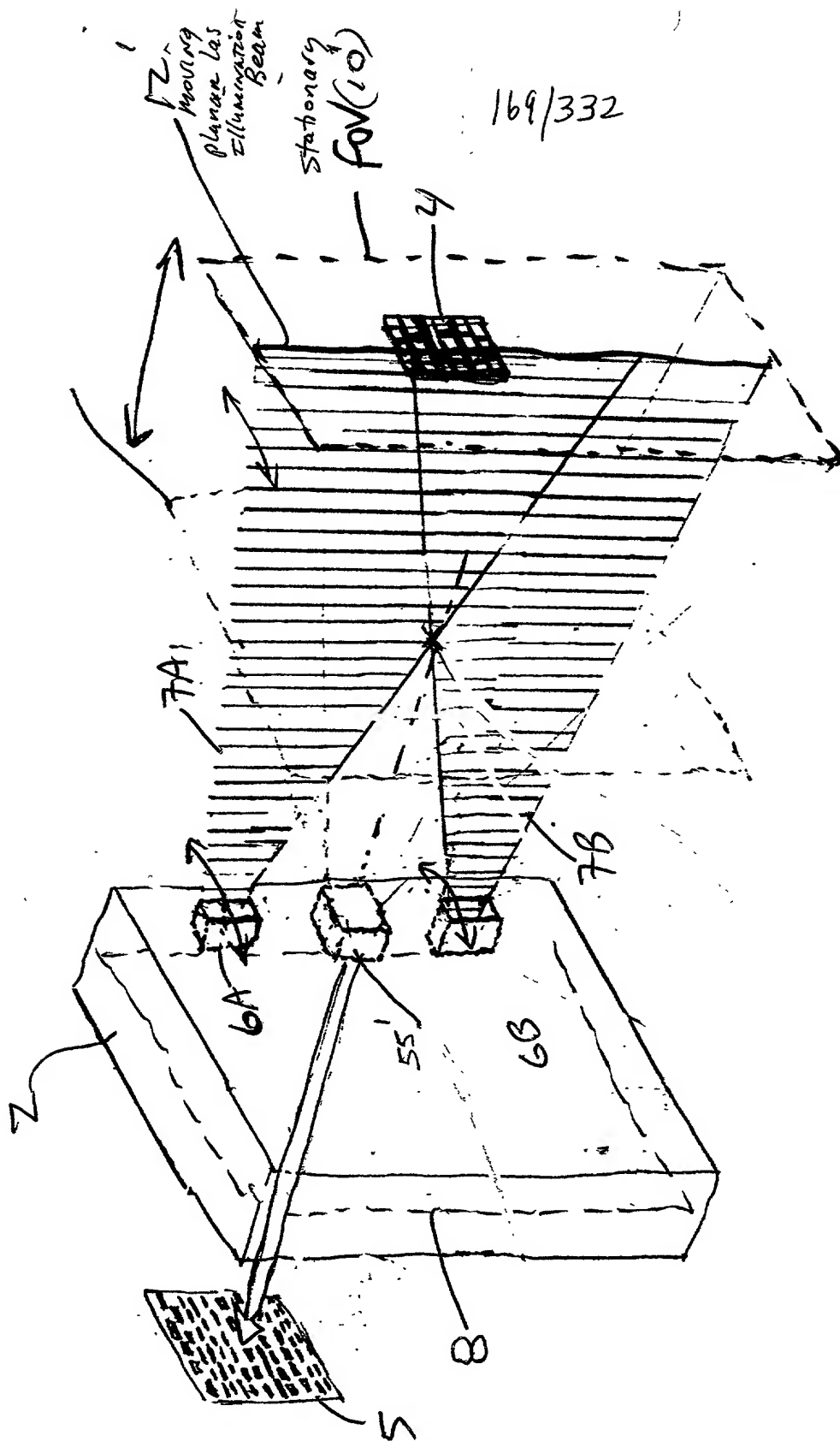


FIG. 4E

- Hand-held Scanner
- Presentation Scanner

90

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↑

AG 5A

20140201 04:12:30

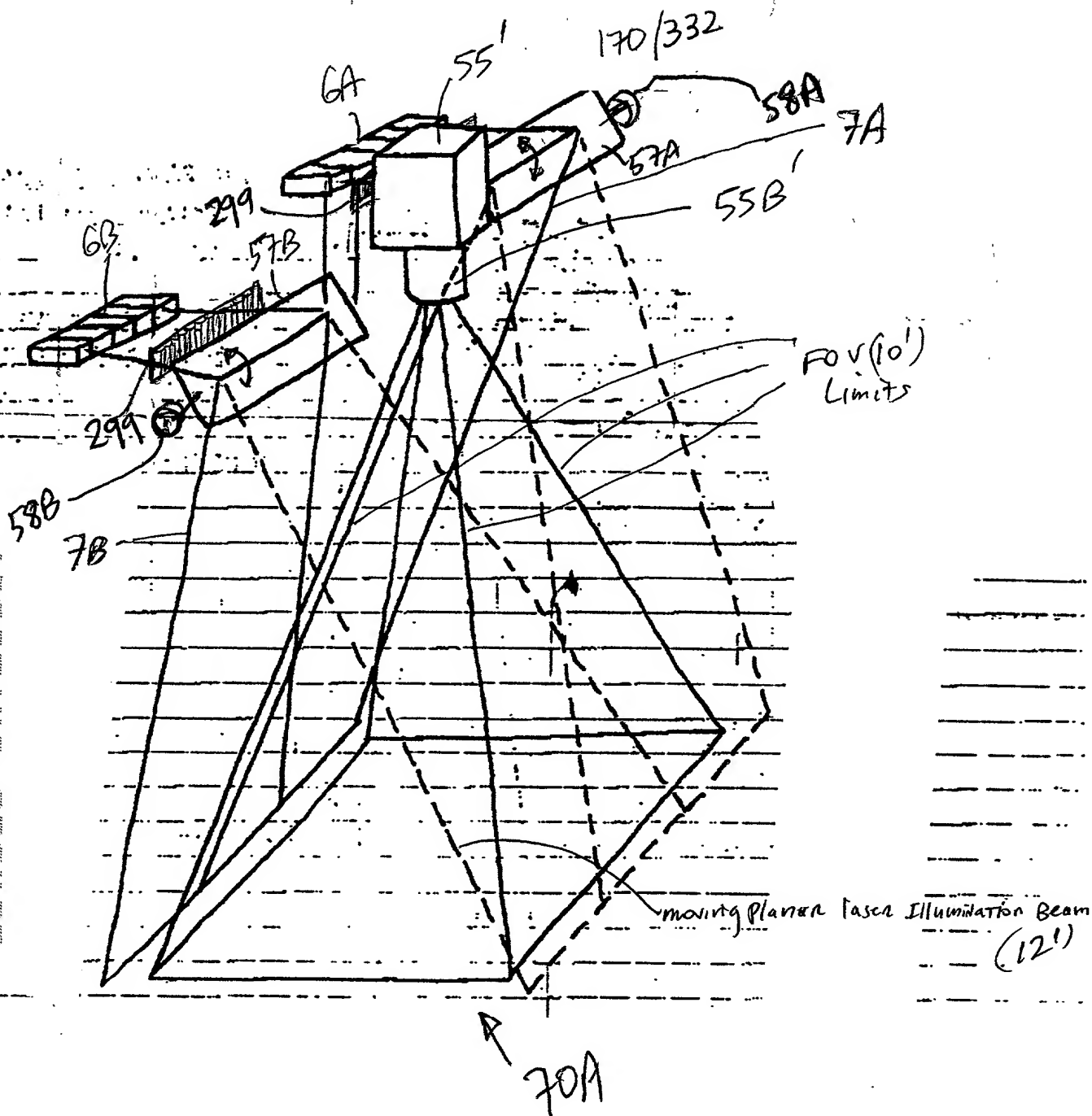


FIG 5B1

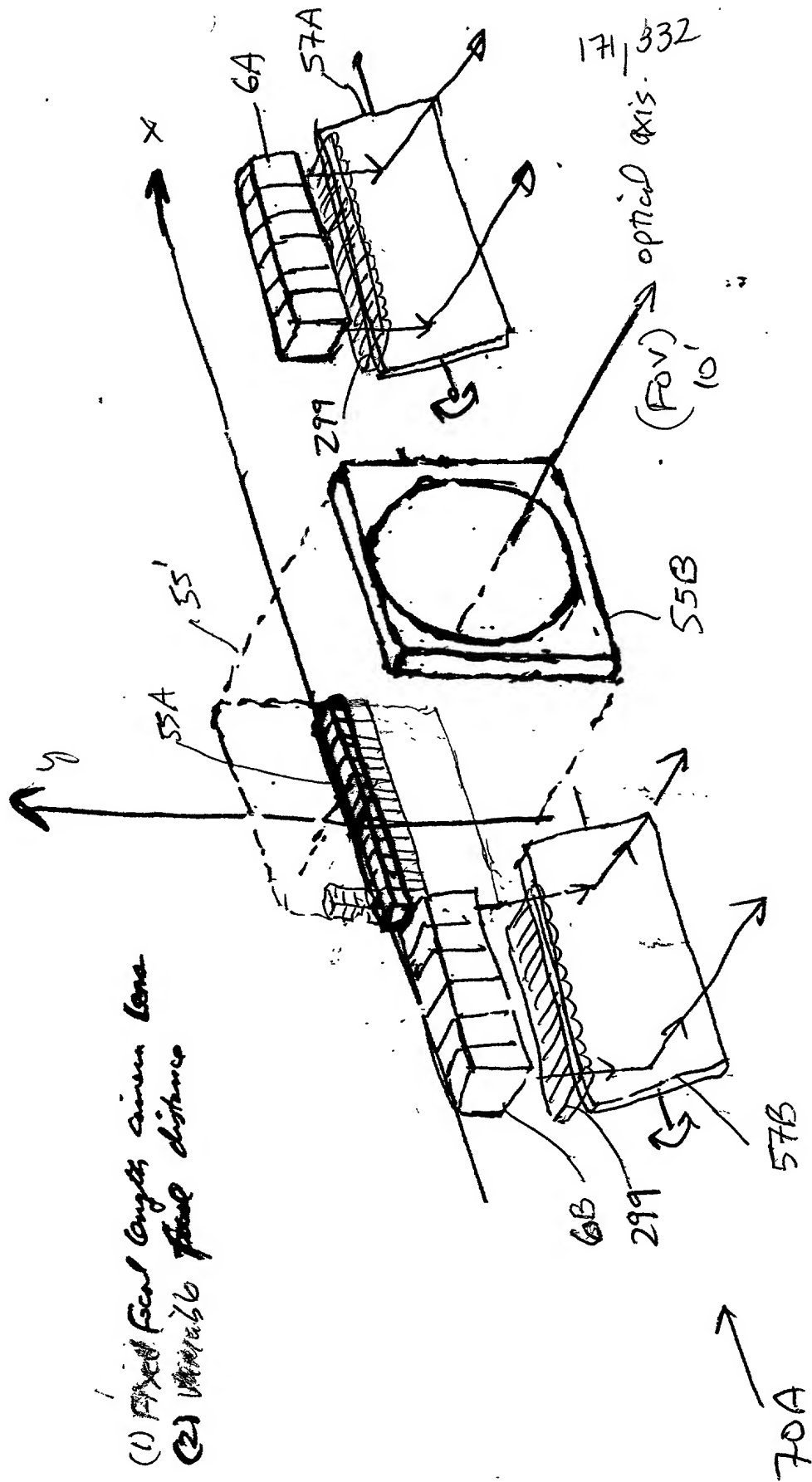


FIG. 5B2

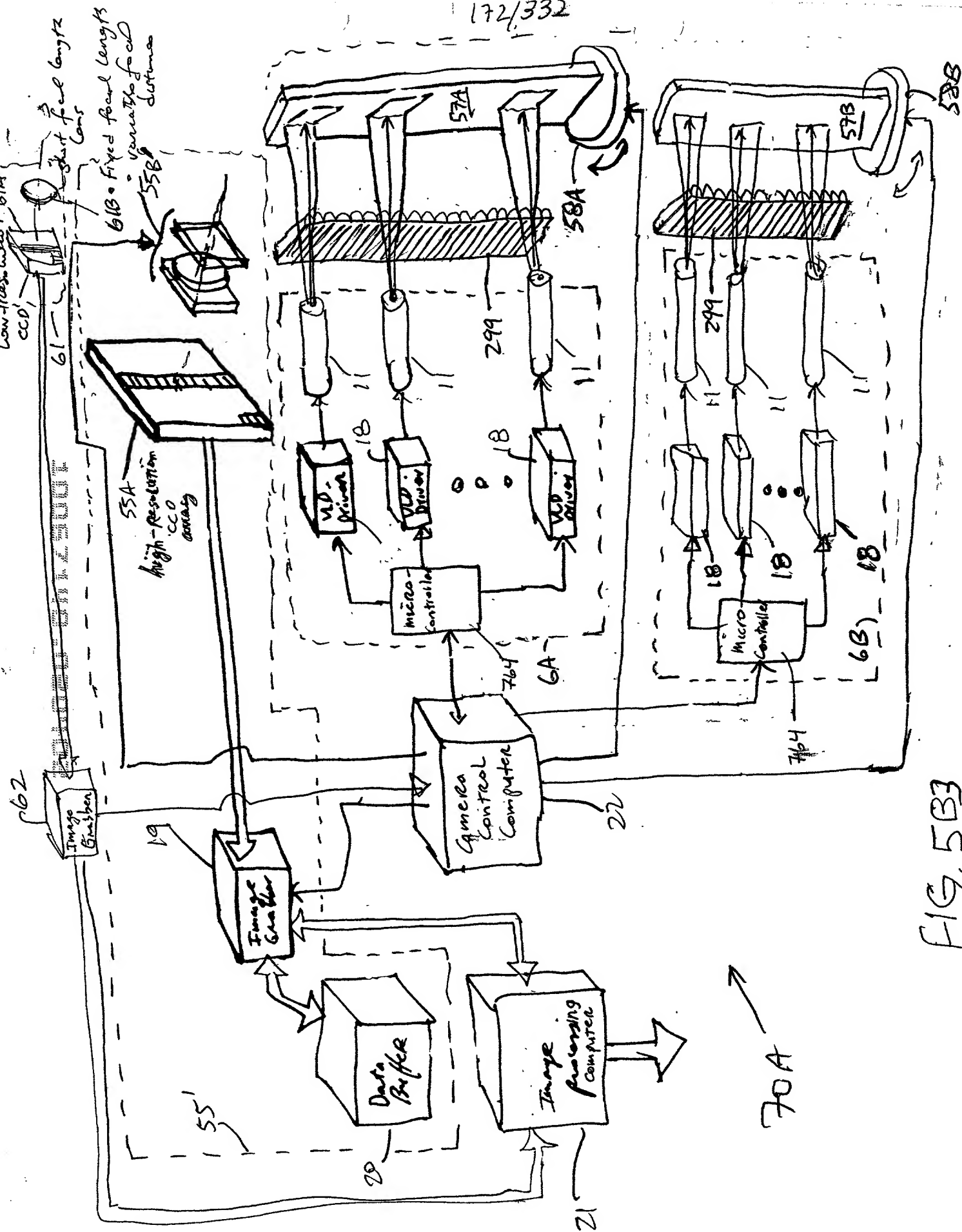
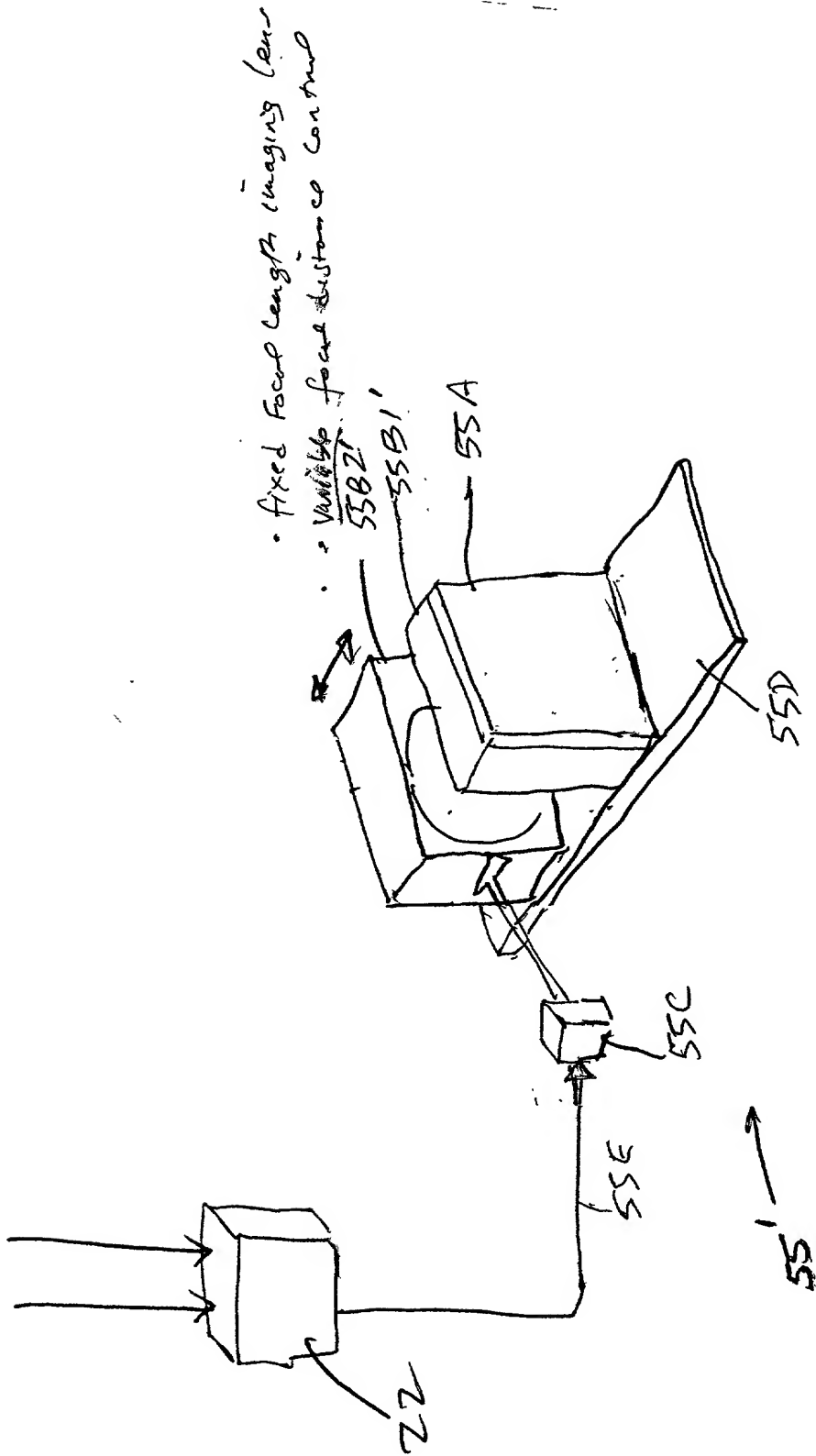


FIG. 5B3

FIG. 5B4



• fixed focal length imaging lens  
• ~~variable~~ focal distance control

FIG. 5B4



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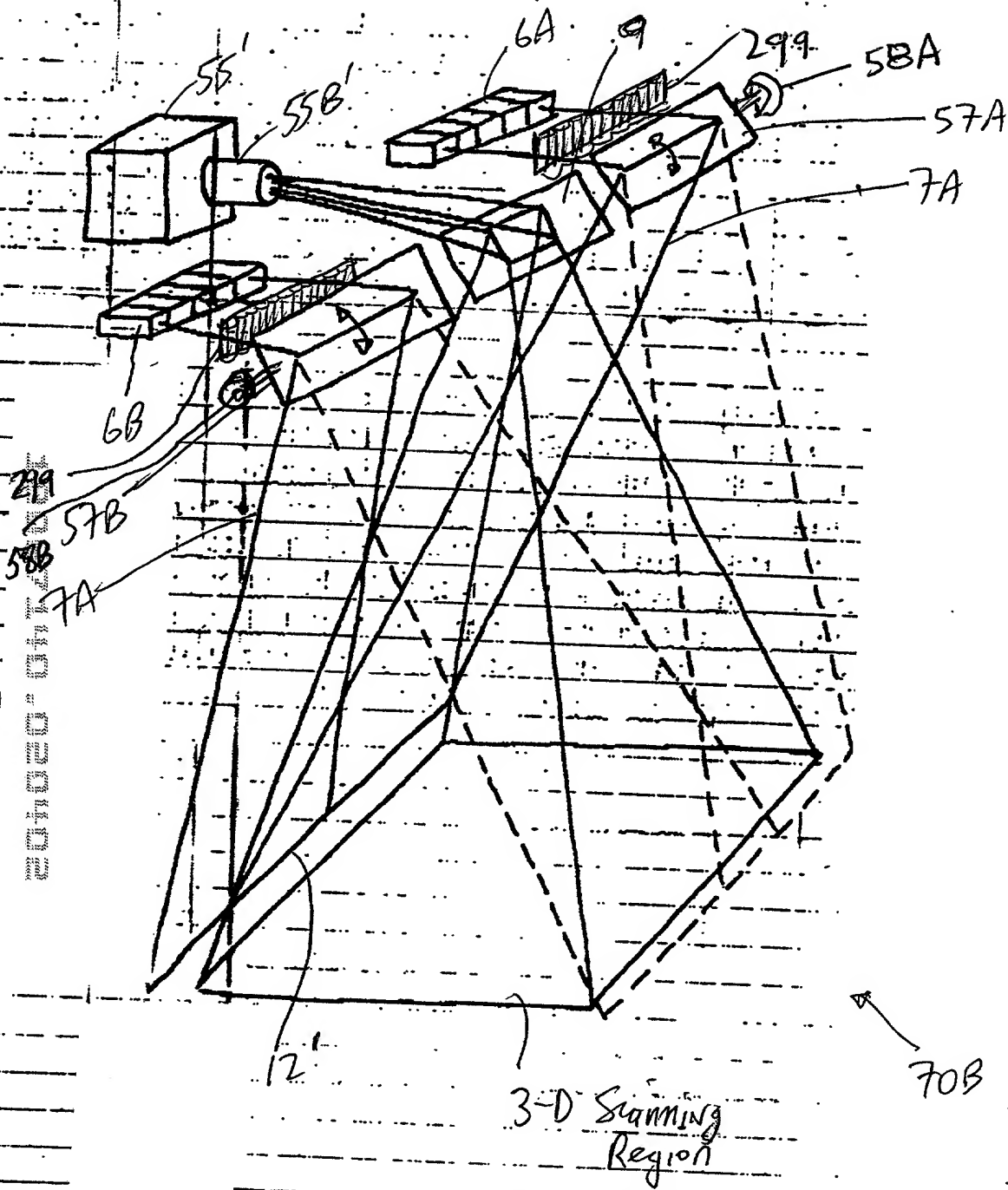
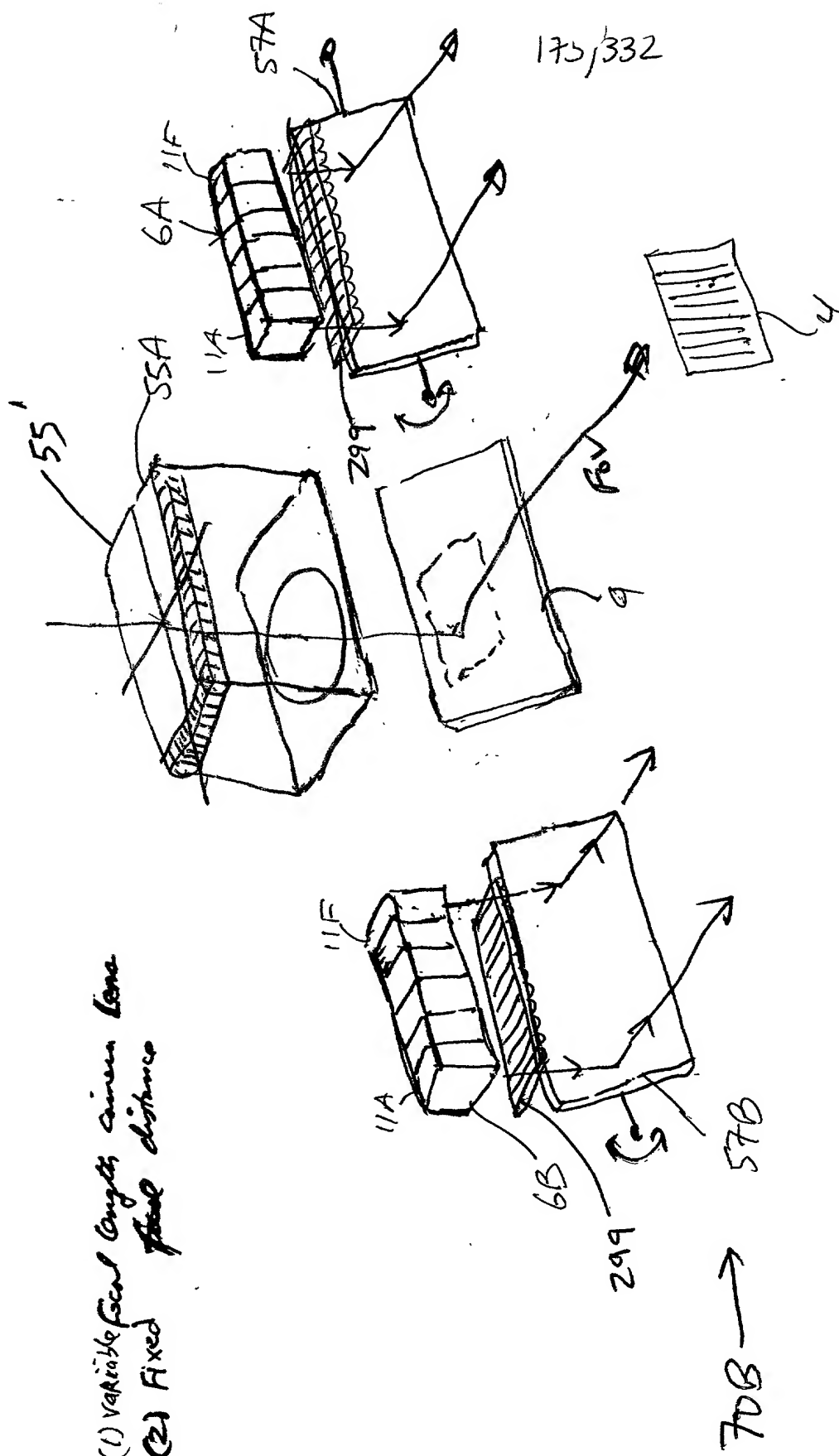


FIG. 5C1

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- (1) Variable focal length lens
- (2) Fixed distance

FIG. 5C

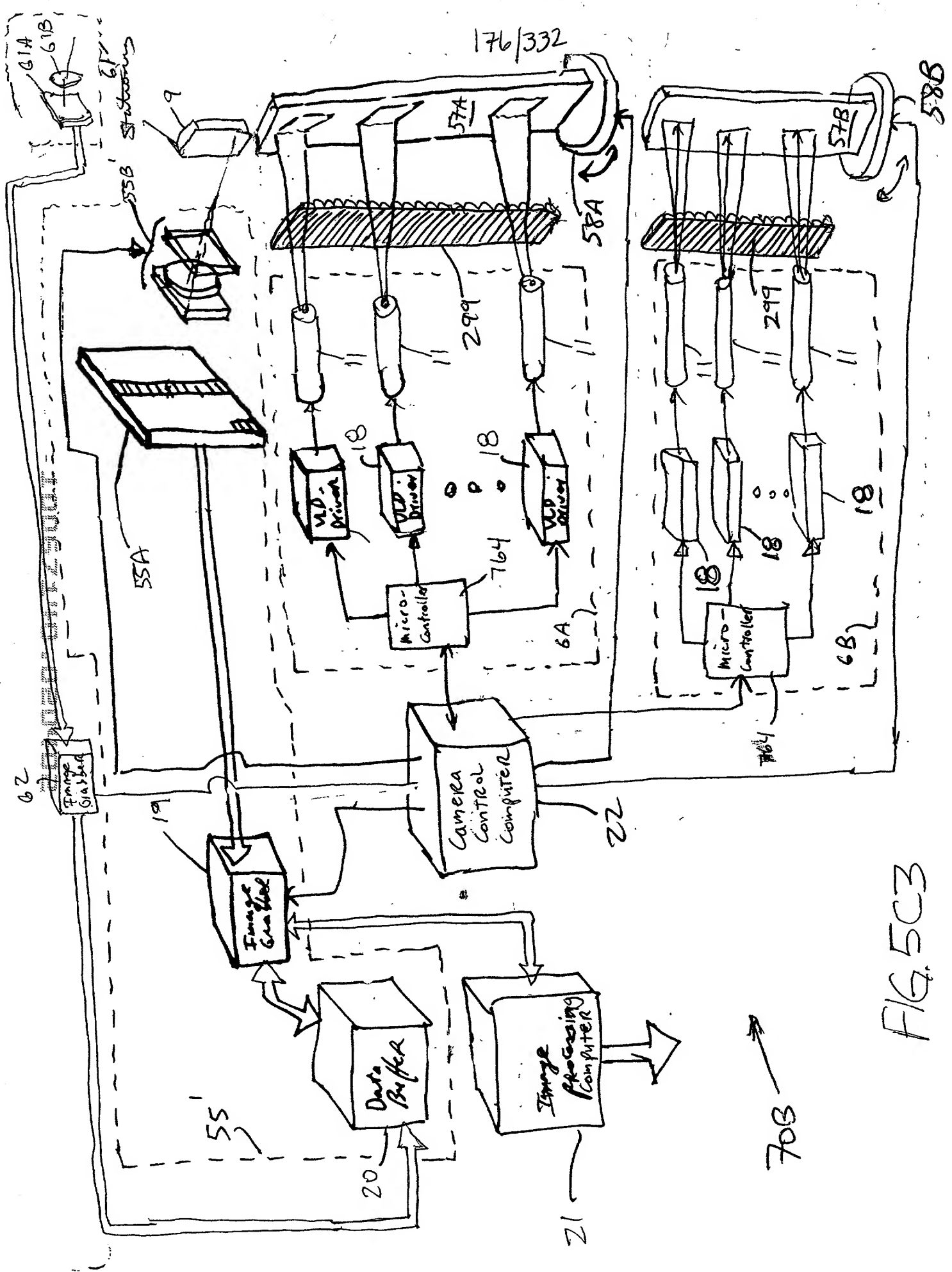


FIG. 5C3

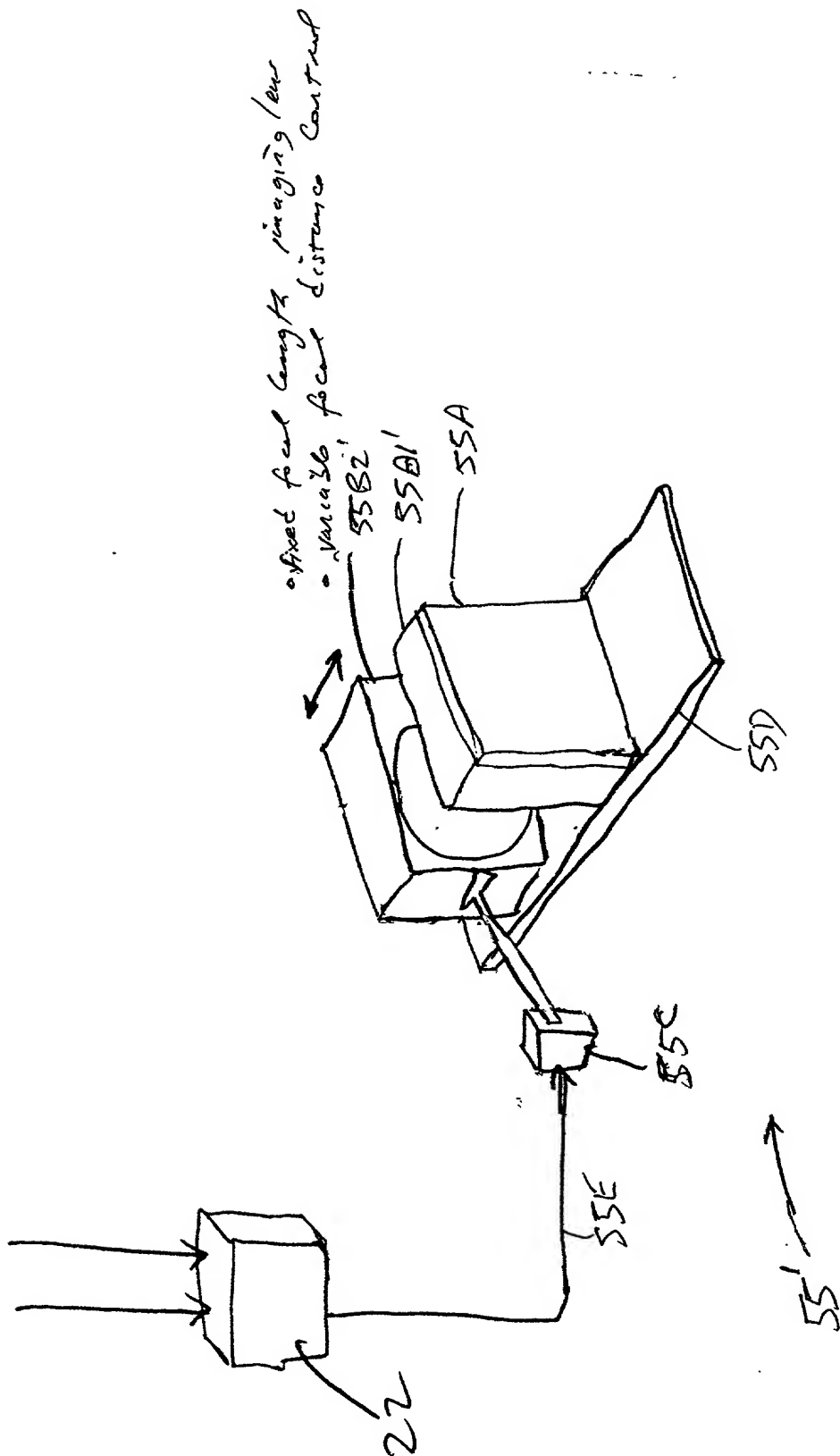


FIG. 5C4

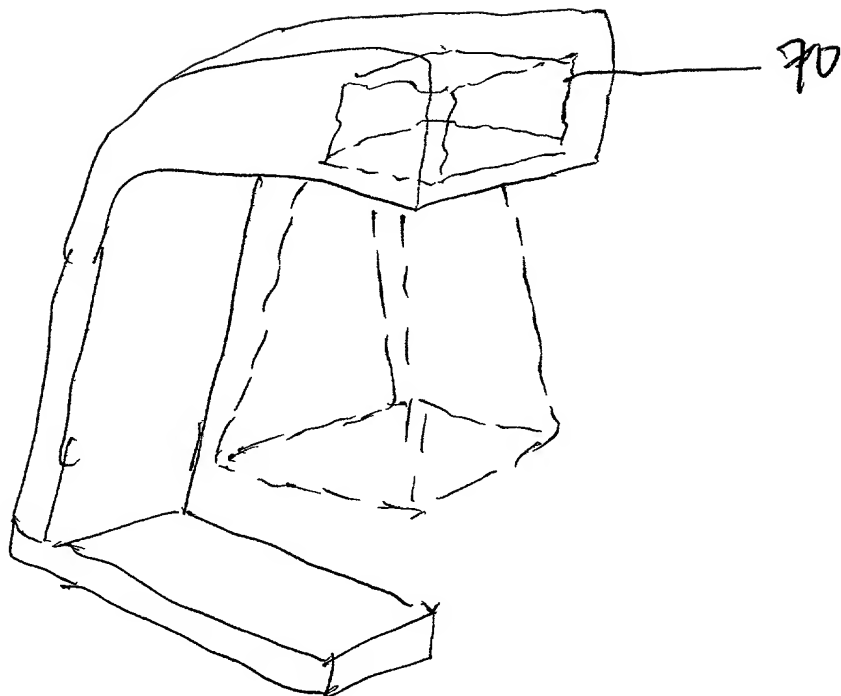
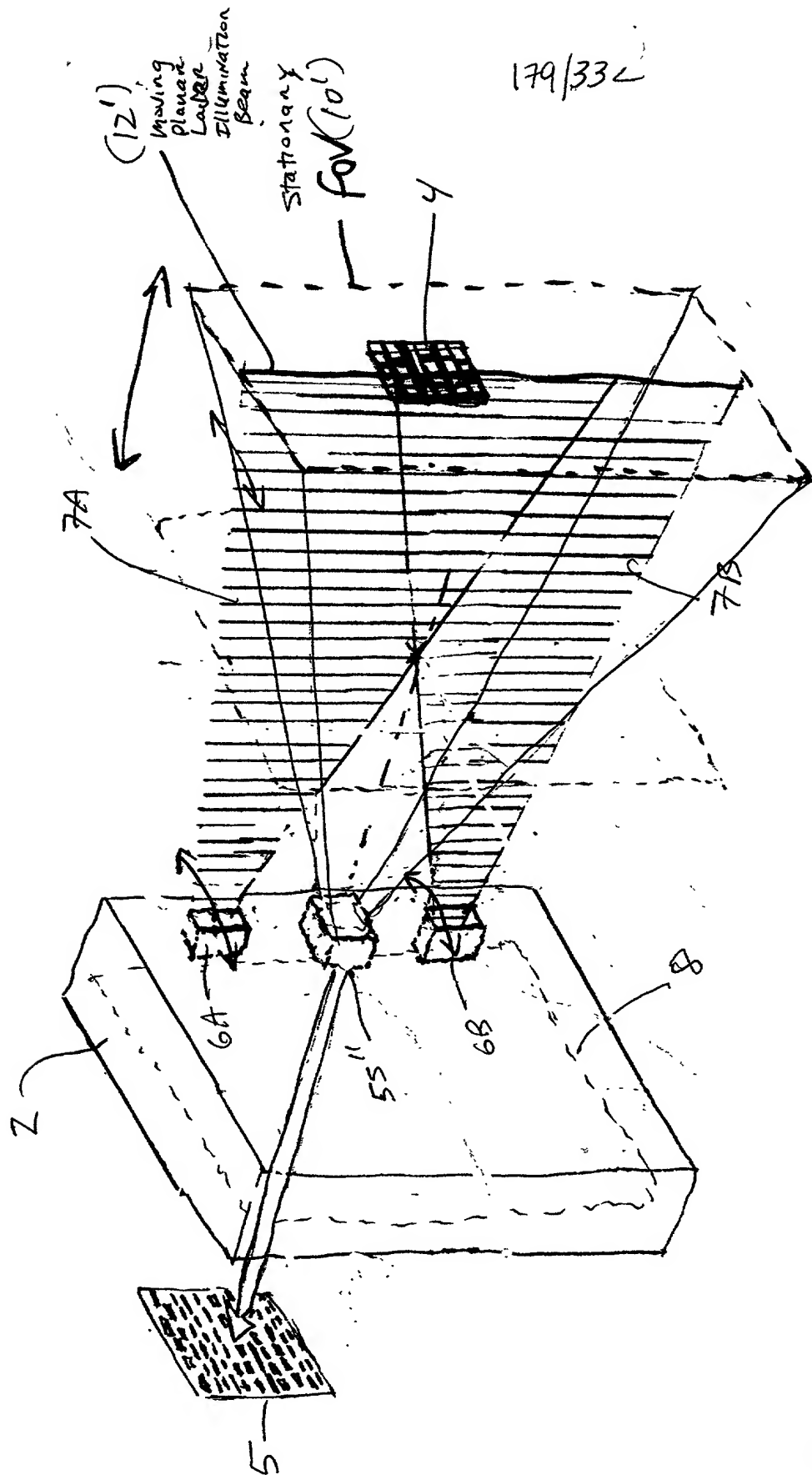
$$178 \overline{) 332}$$


FIG. 5D

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CC

201020-011-3001



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FIG. 6A

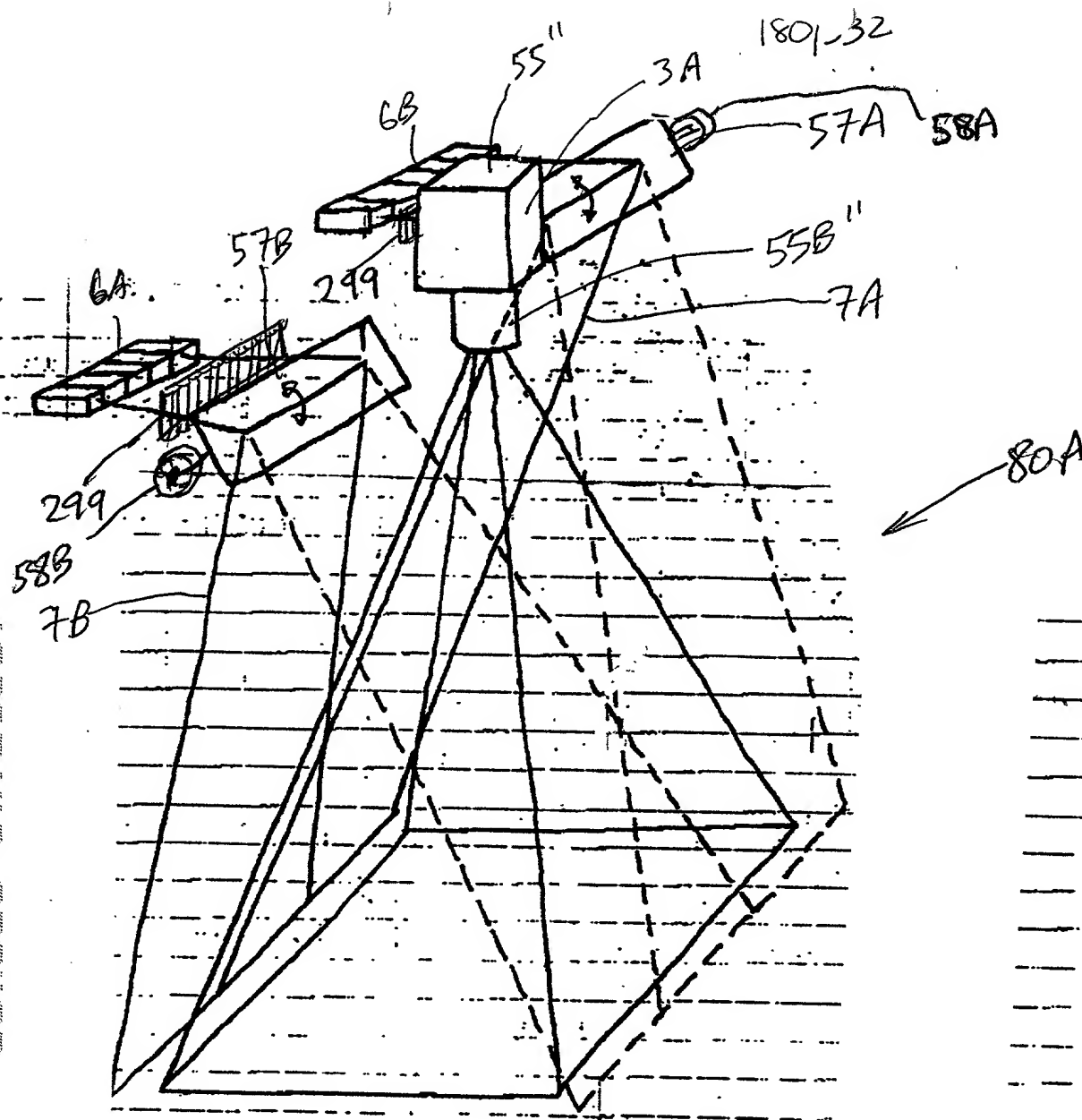
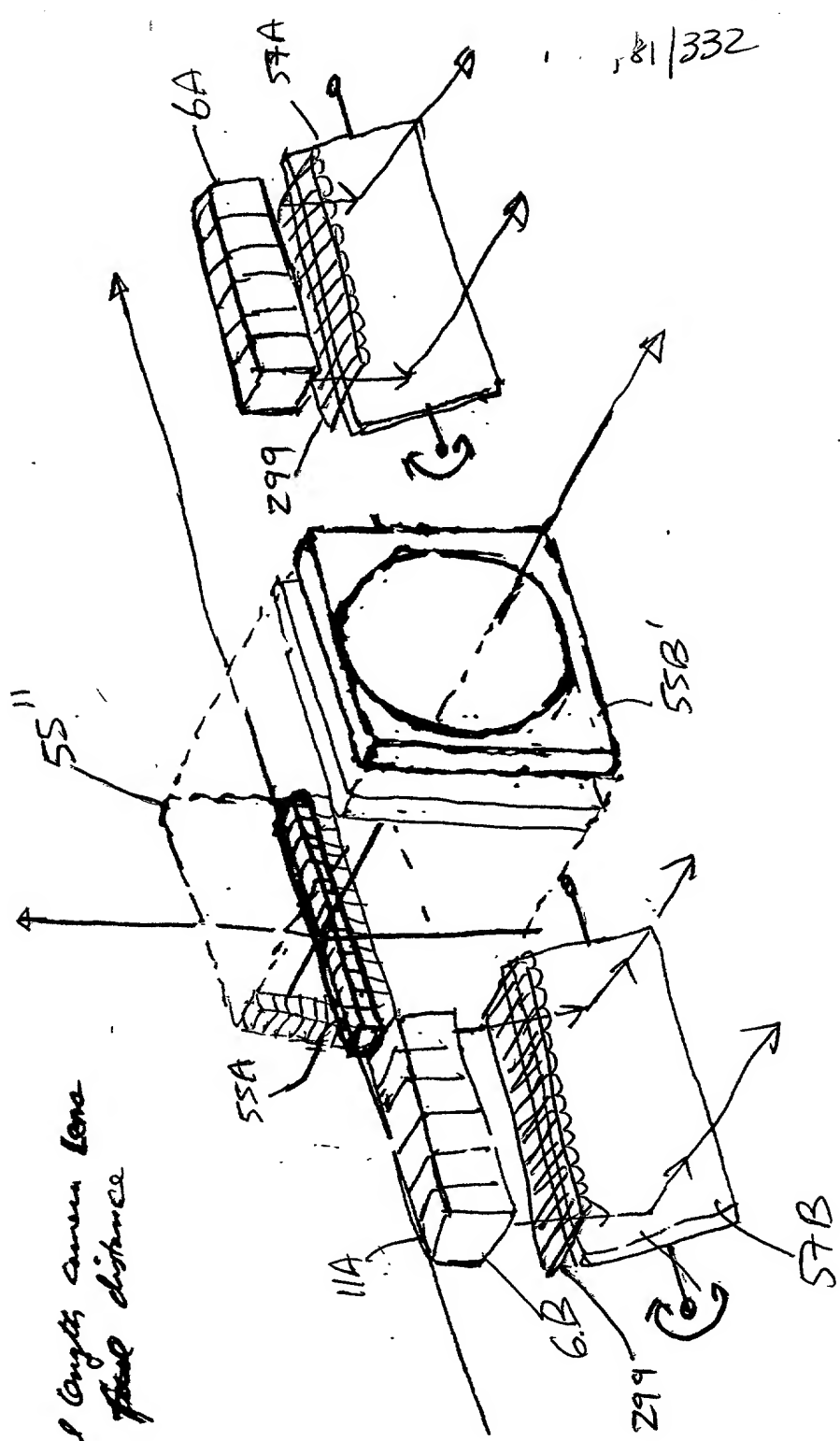


FIG. 6B1



- (1) Variable focal length camera lens
- (2) Variable focal distance

FIG. 6B2

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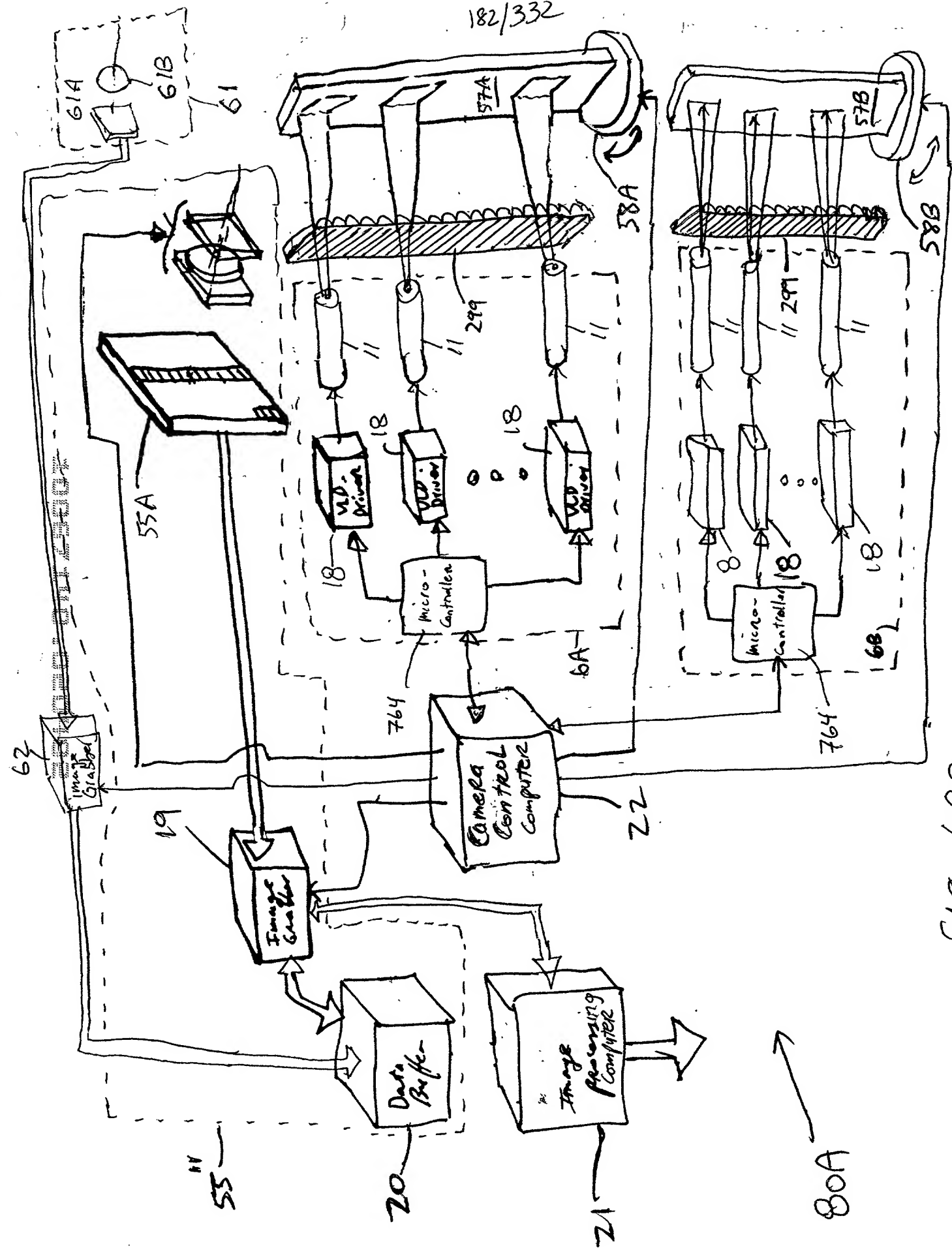


Fig. 6B3

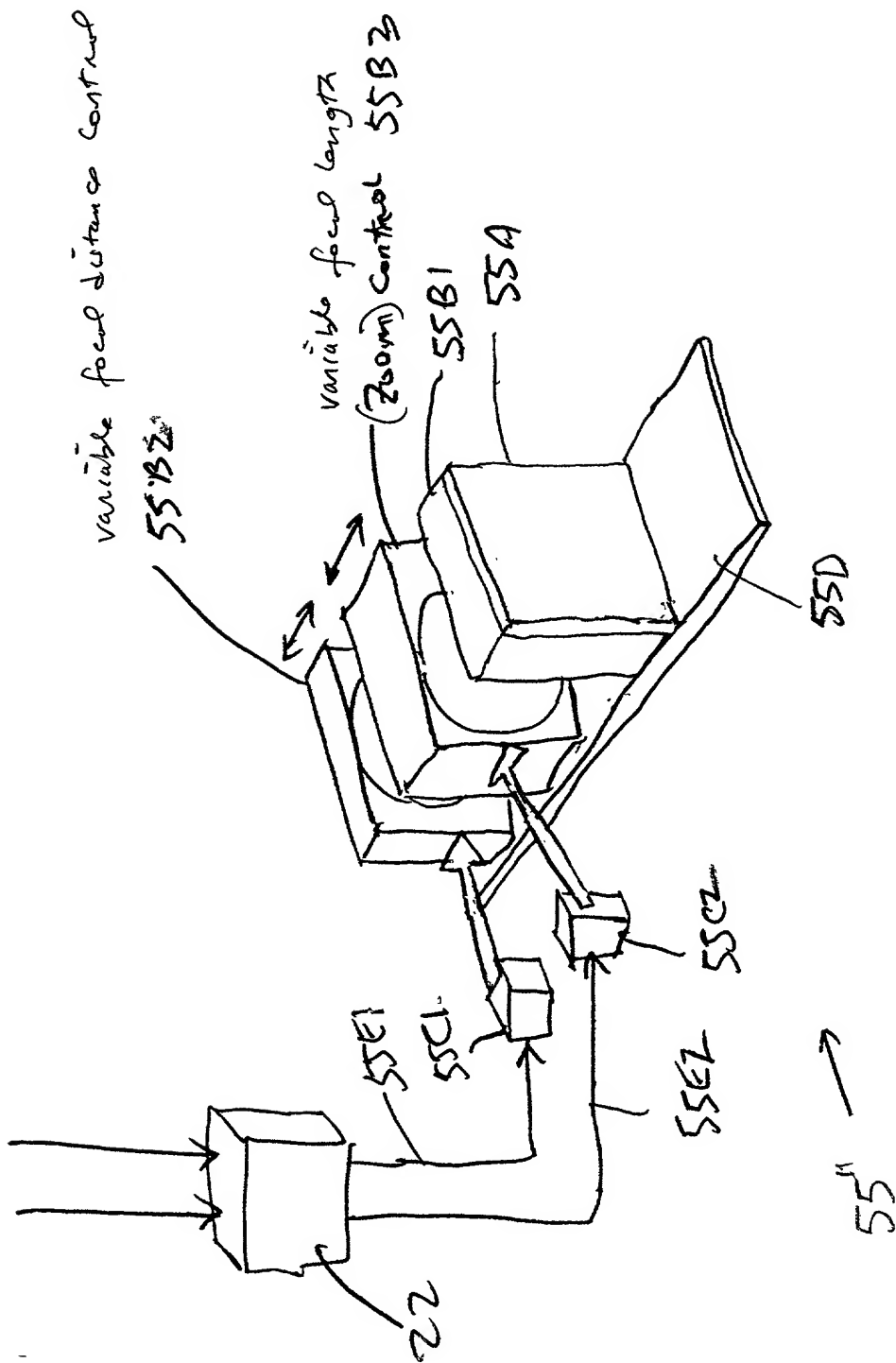


FIG. 6B4

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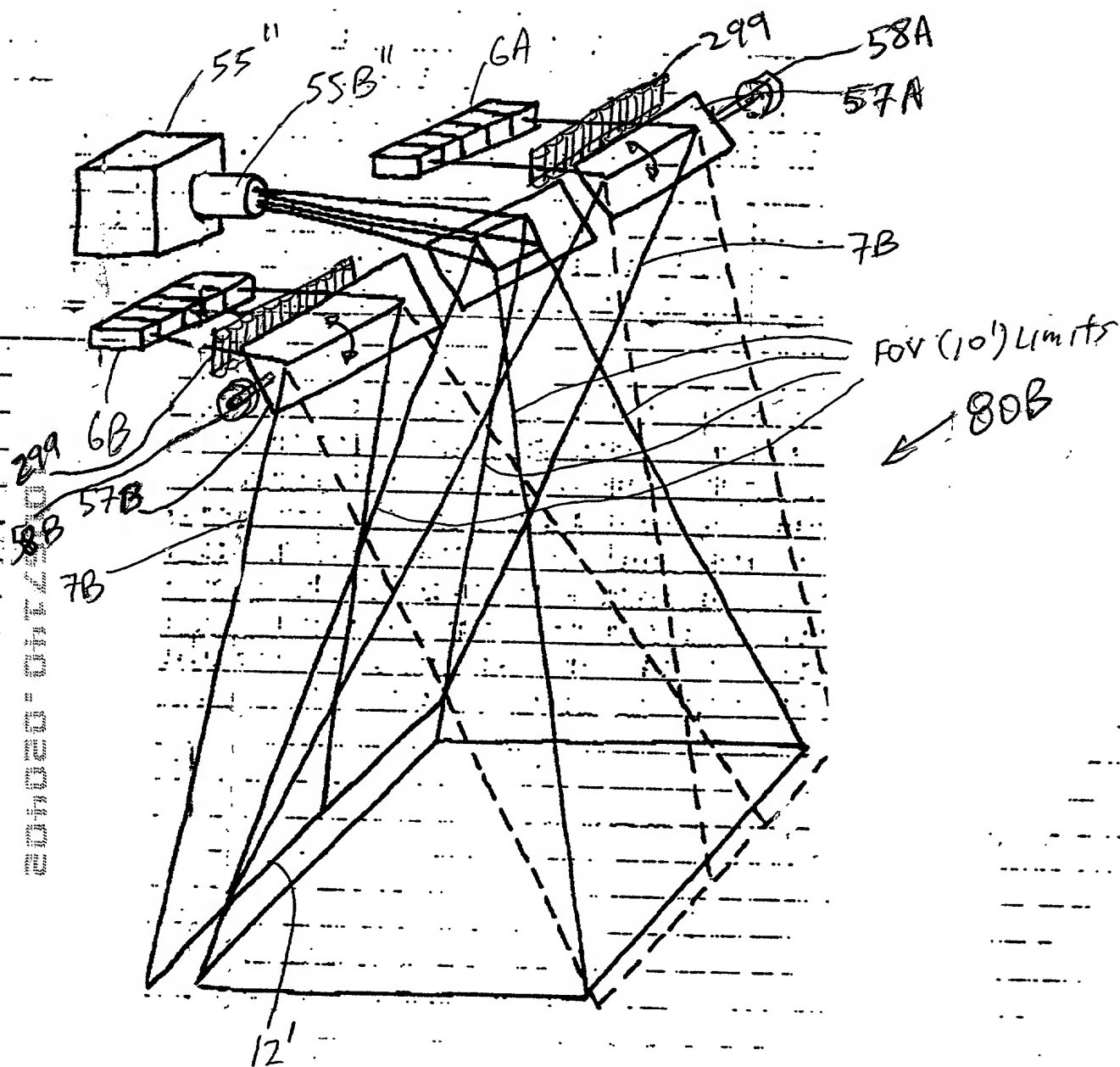


FIG. 6C1

- (1) Variable focal length camera lens
- (2) Variable field distance

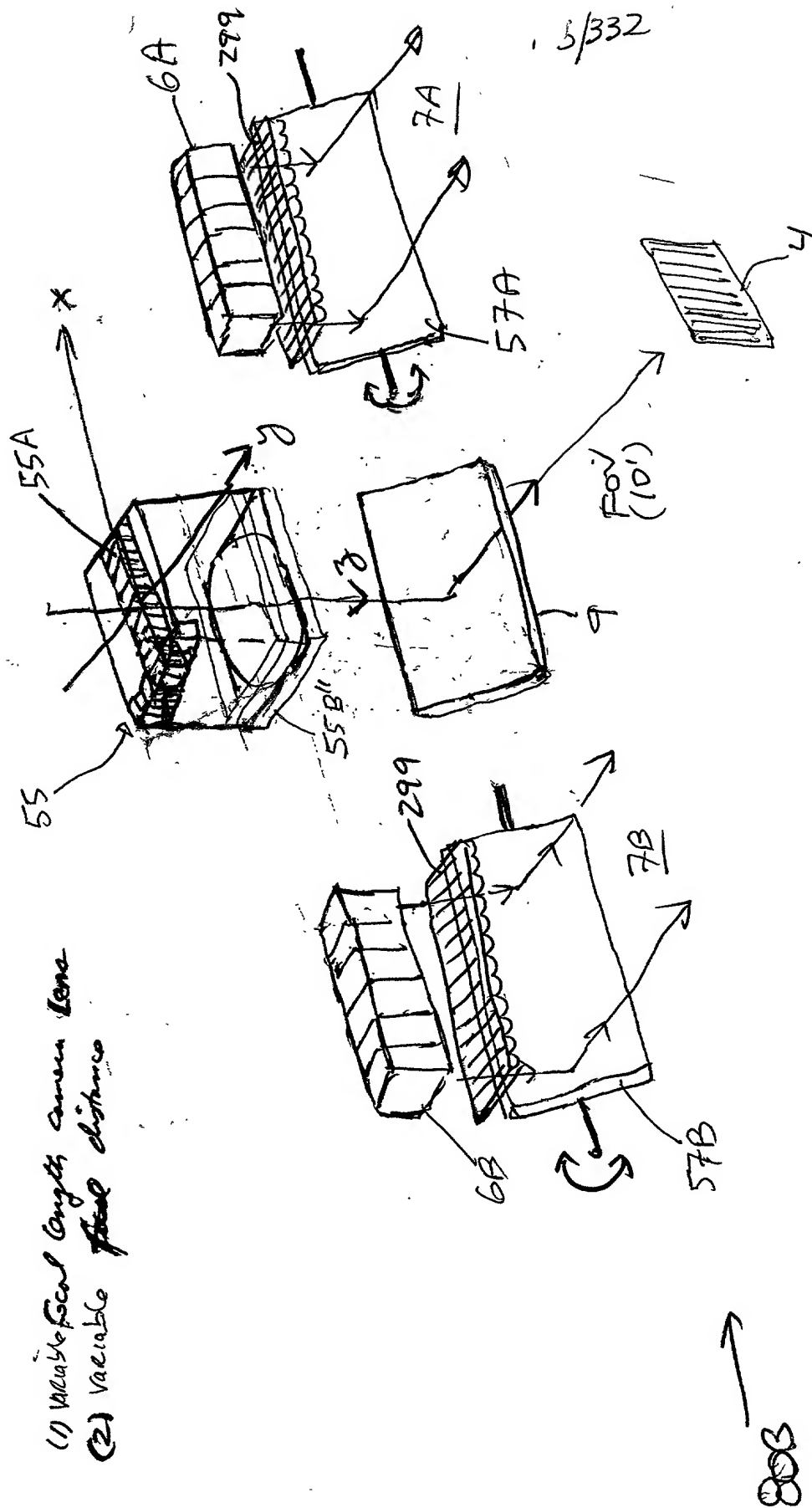




FIG. 6C3

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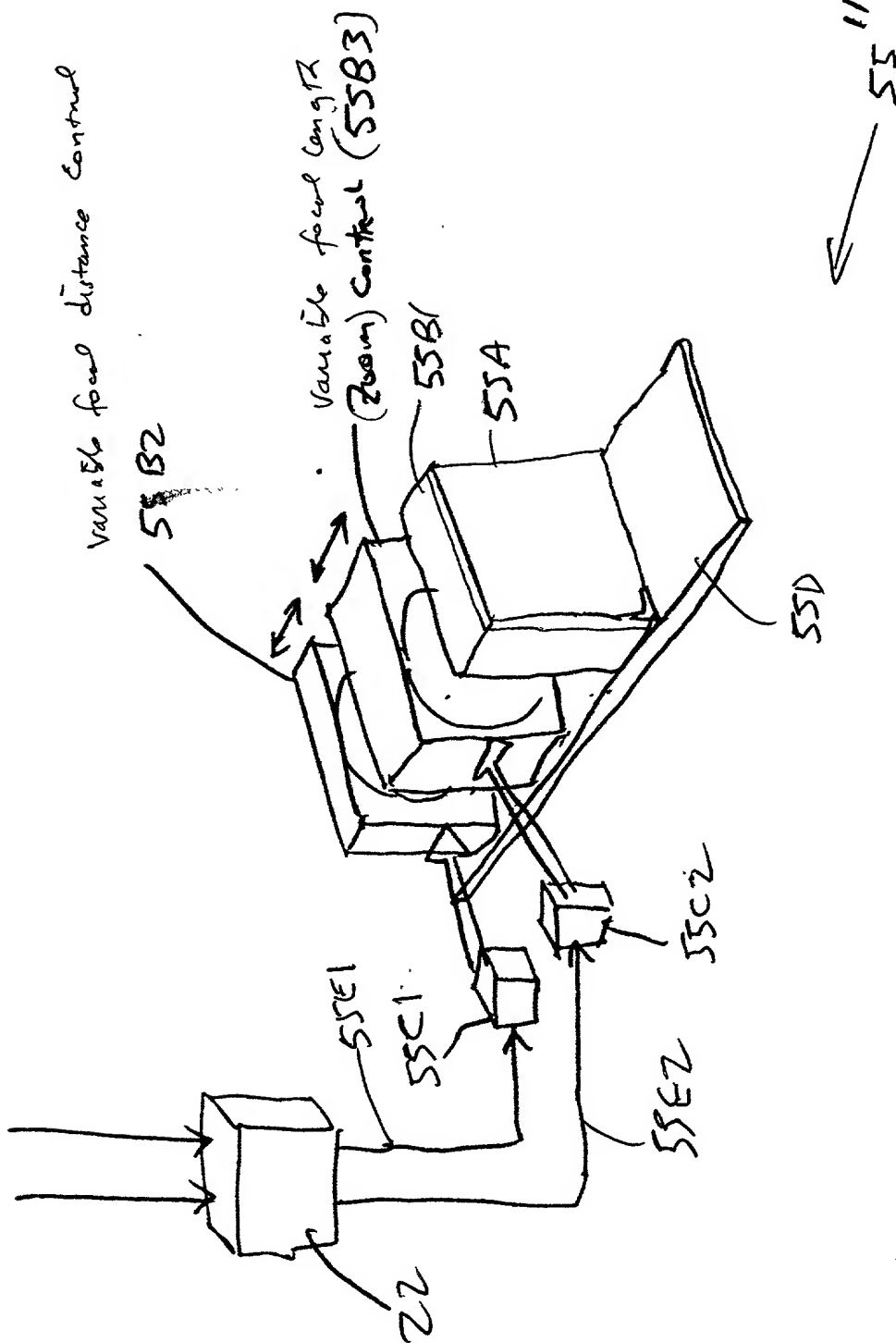


FIG. 6C4

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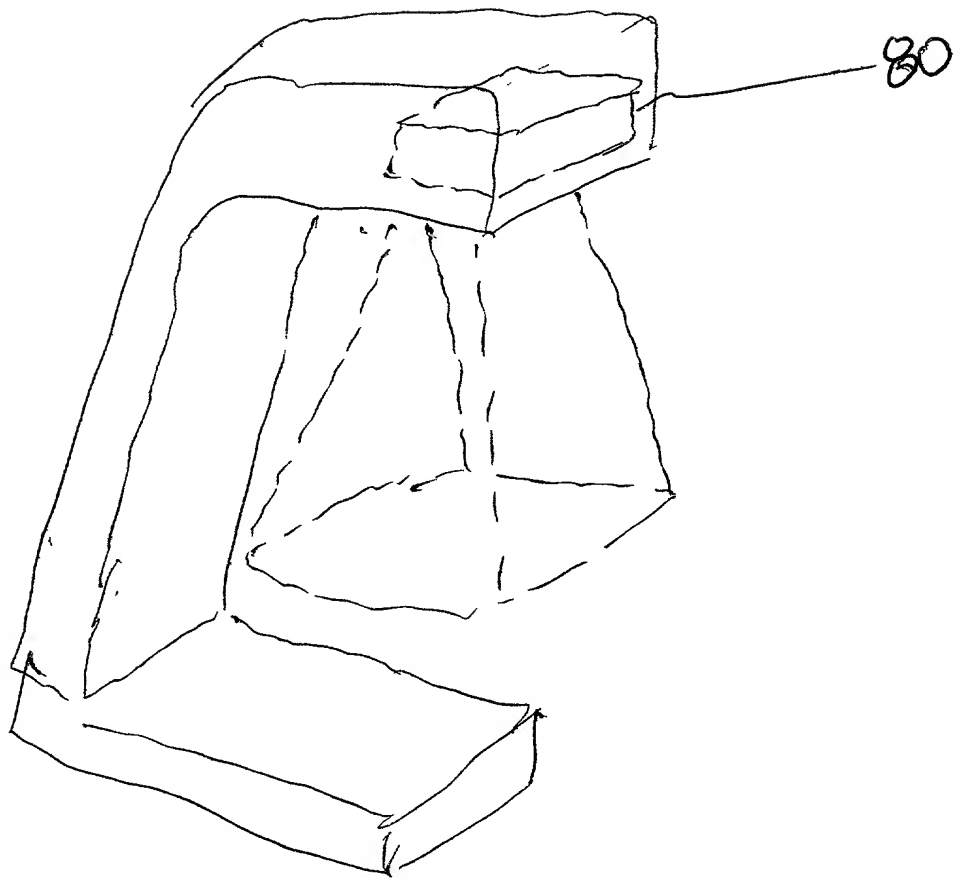
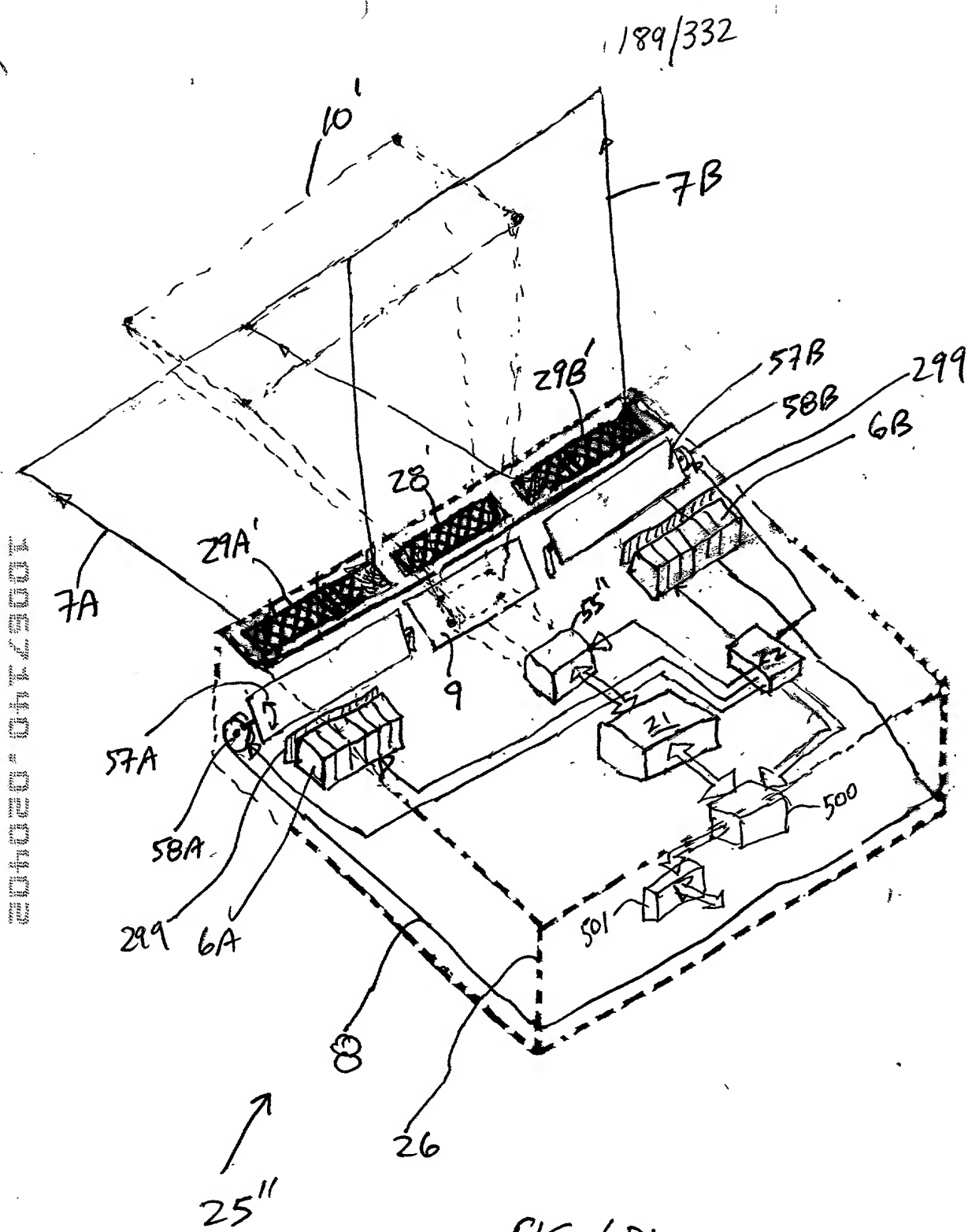


FIG. 6C5





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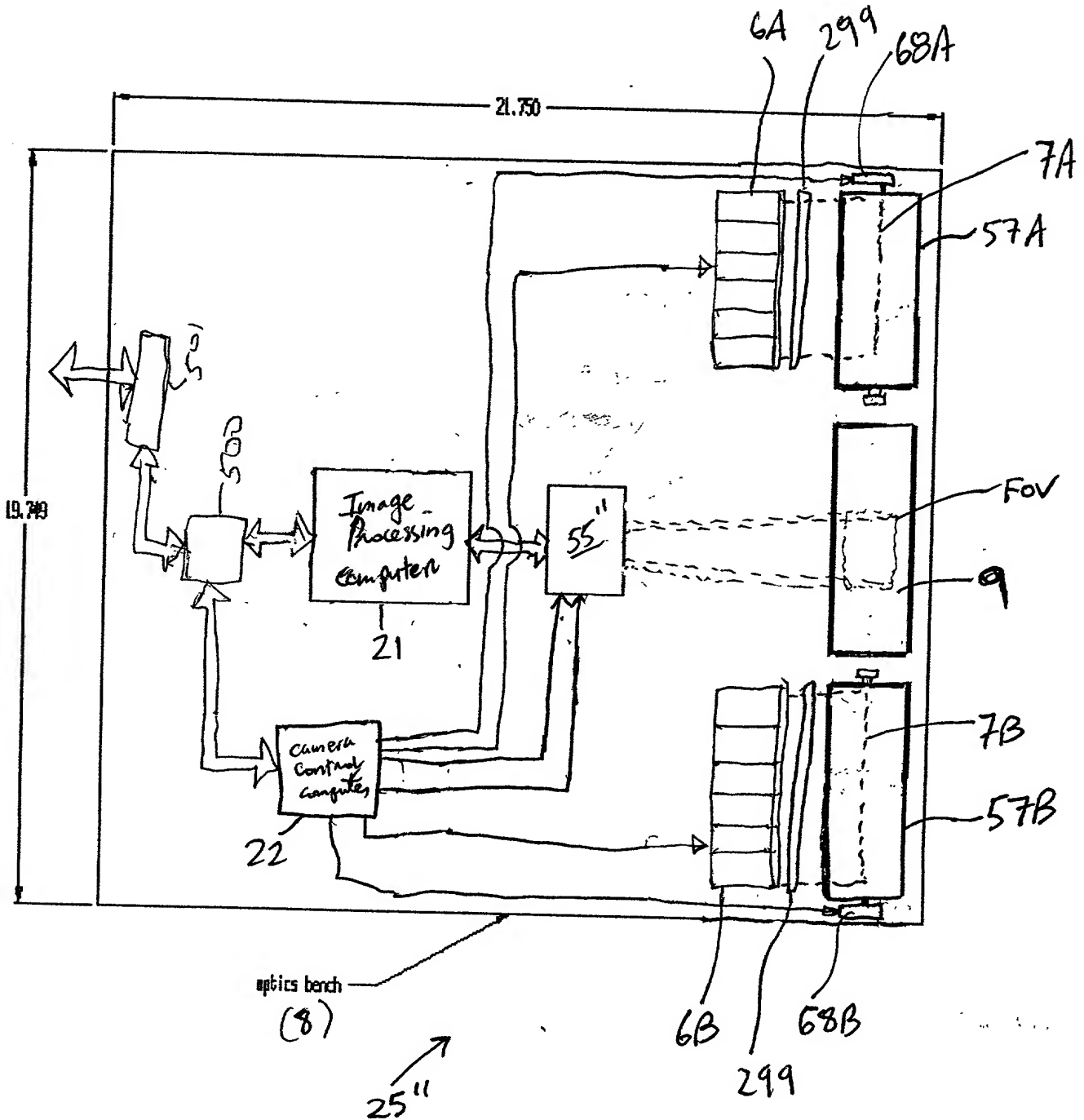


FIG. 6D2

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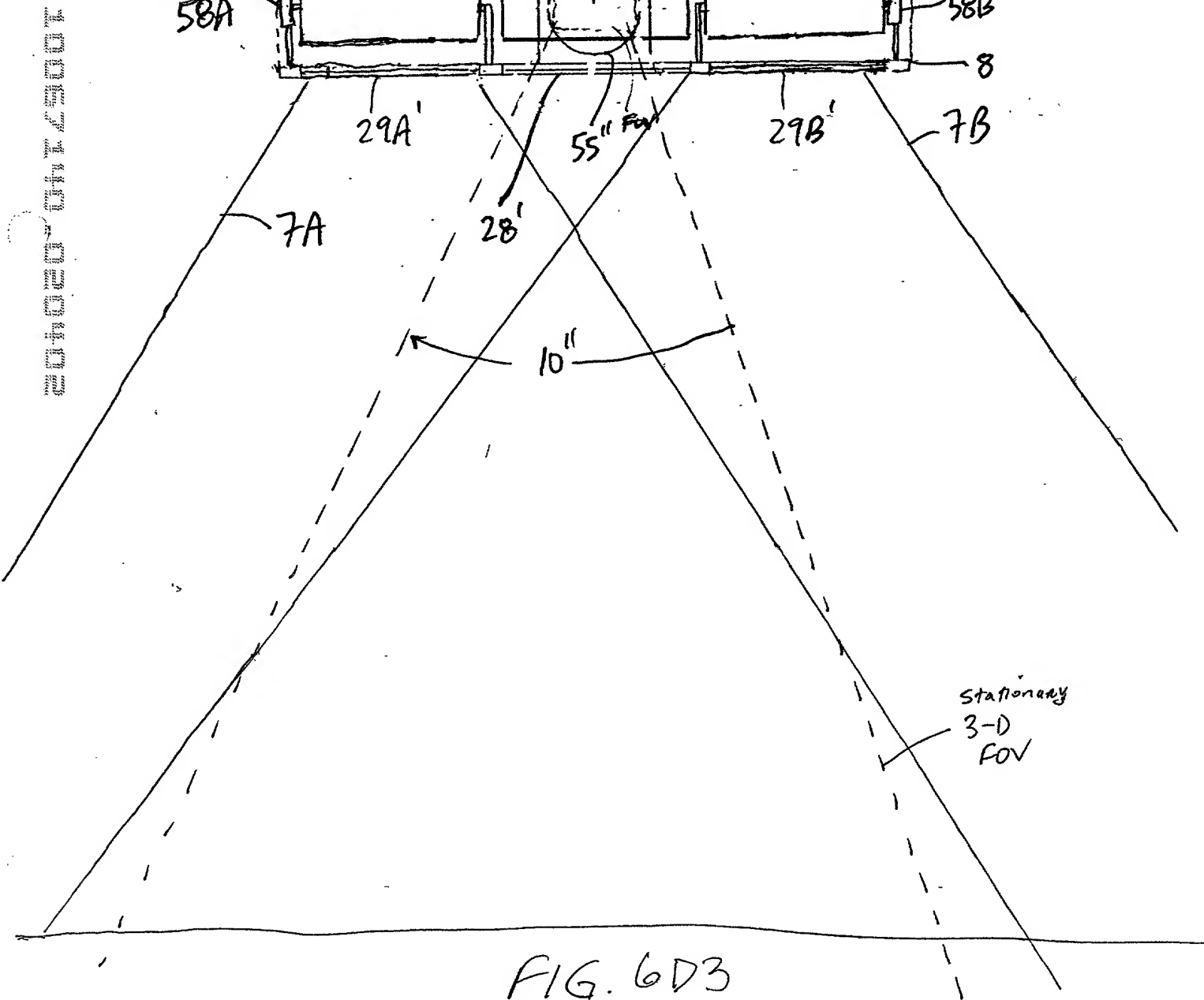
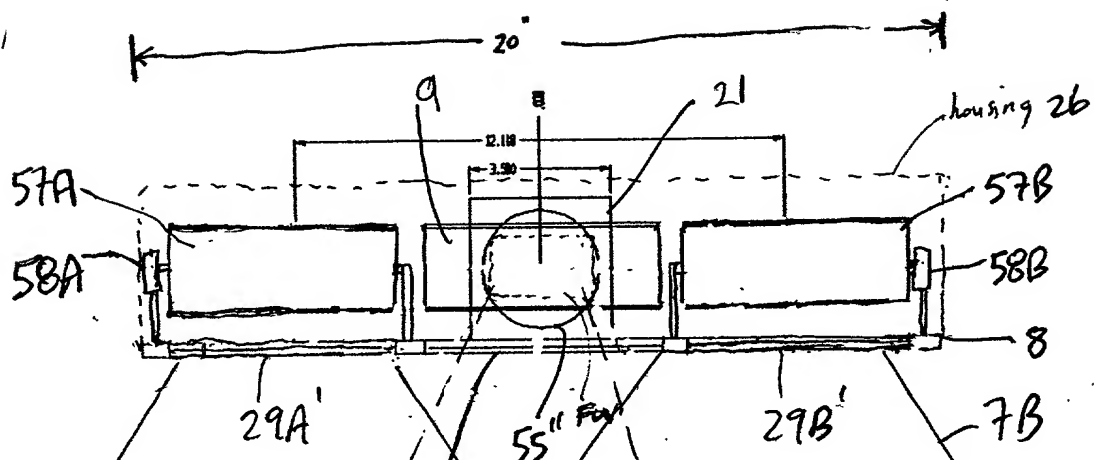


FIG. 6D3

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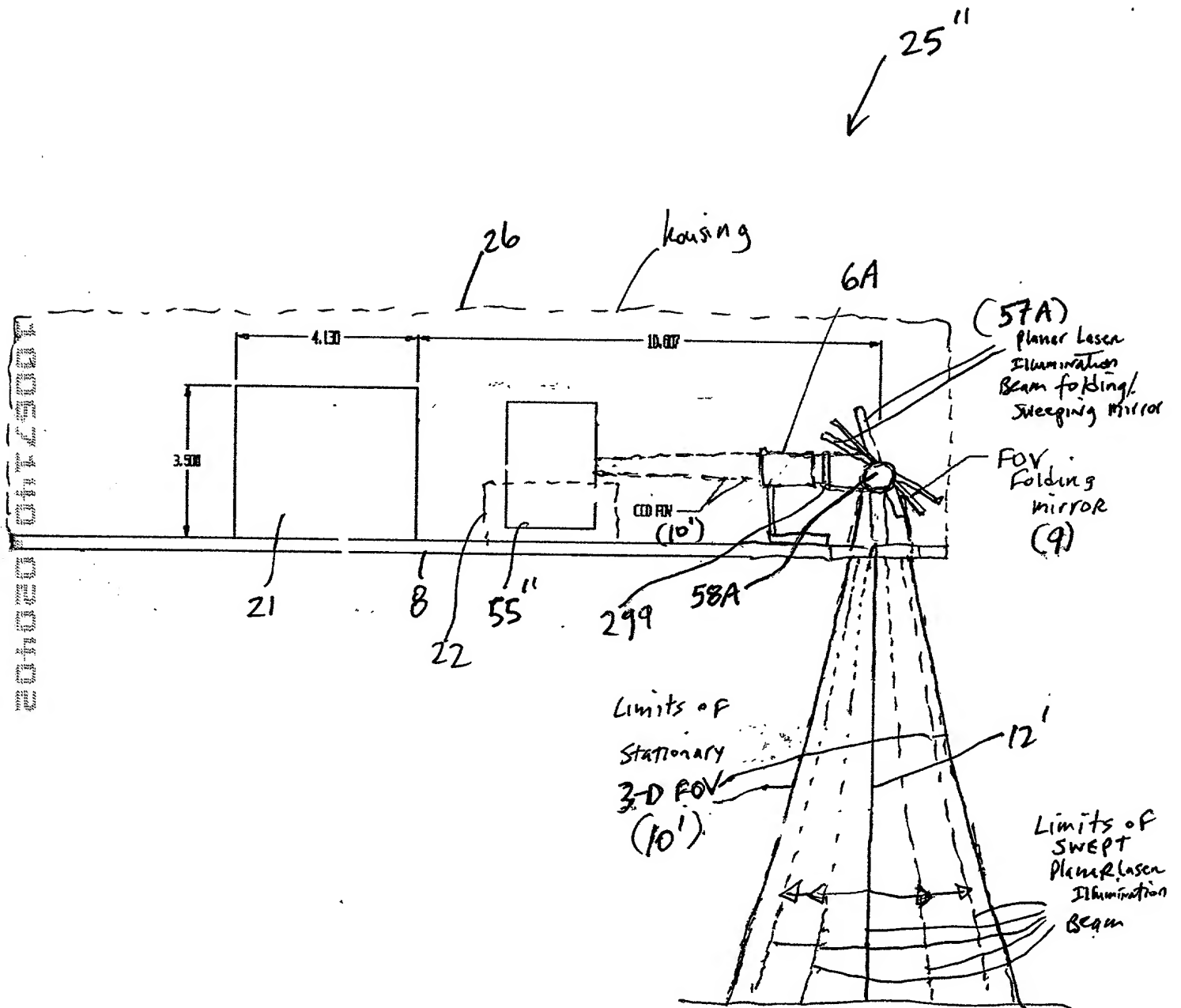


FIG. 6D4

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variable FOV

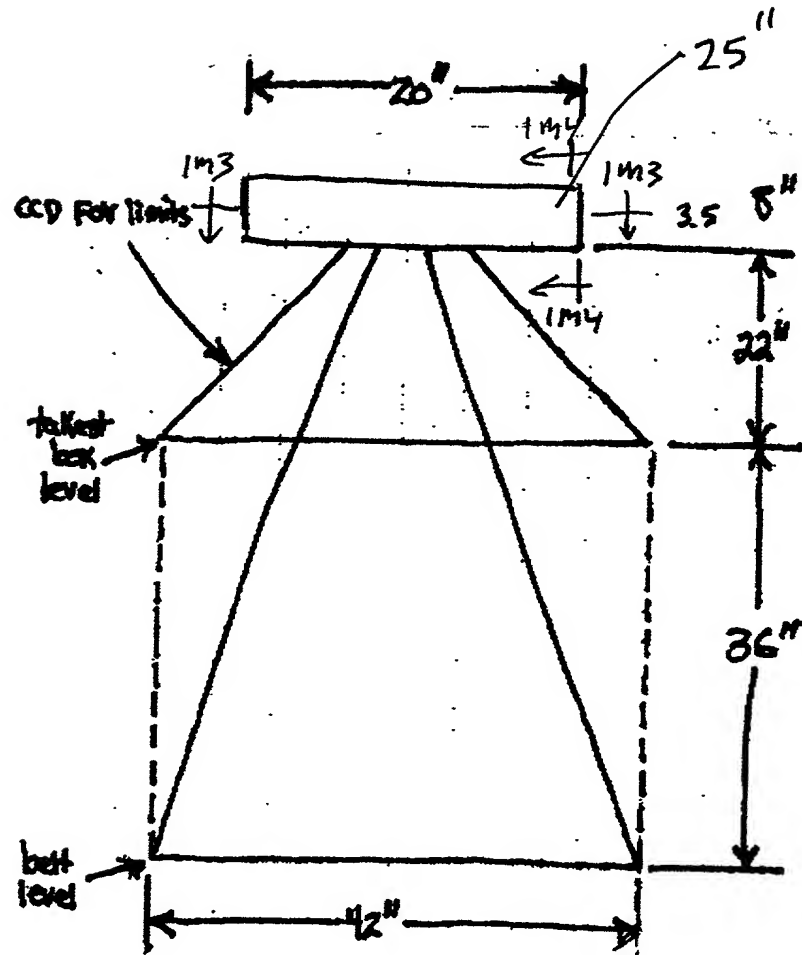


FIG. 6D5

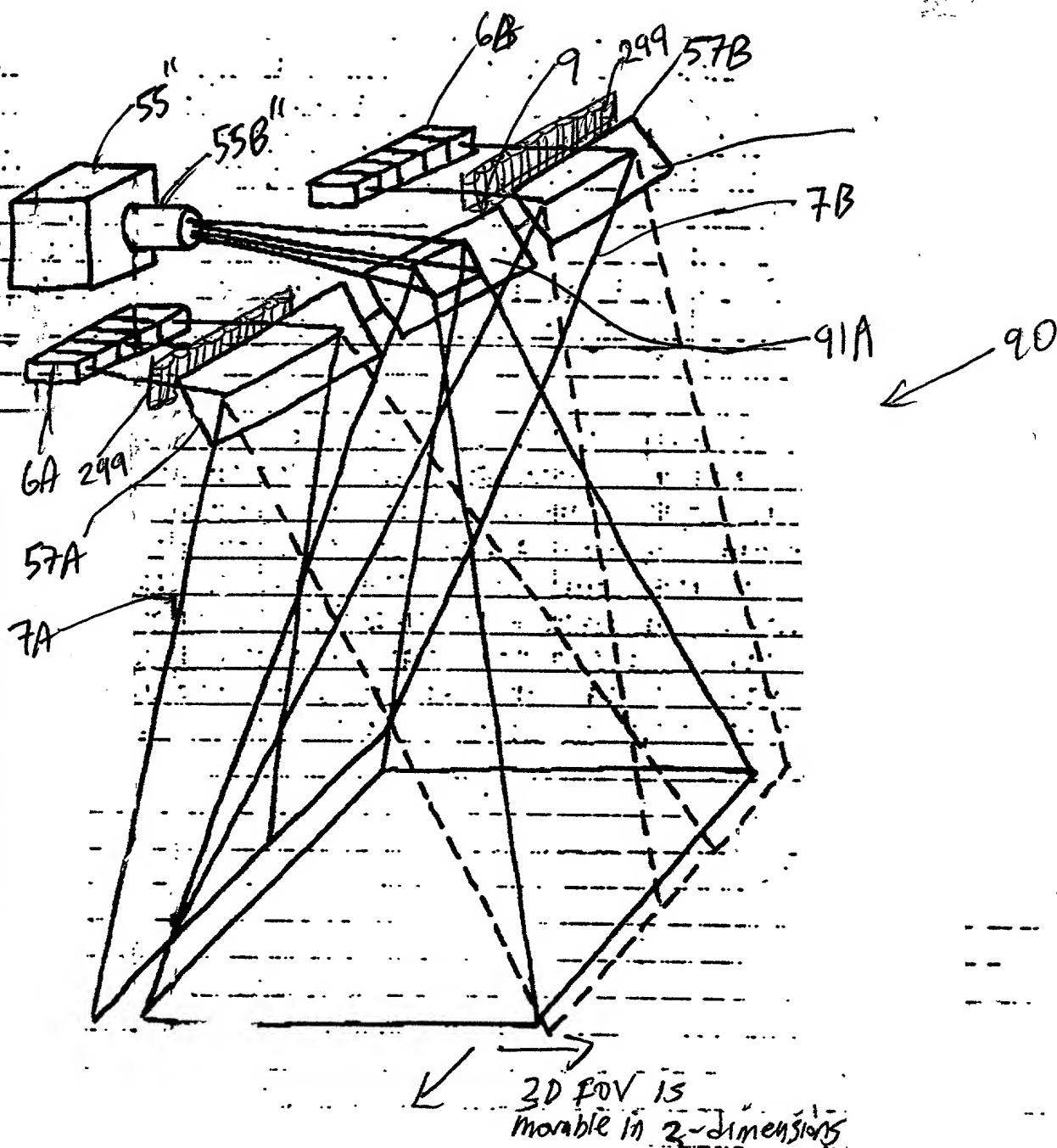
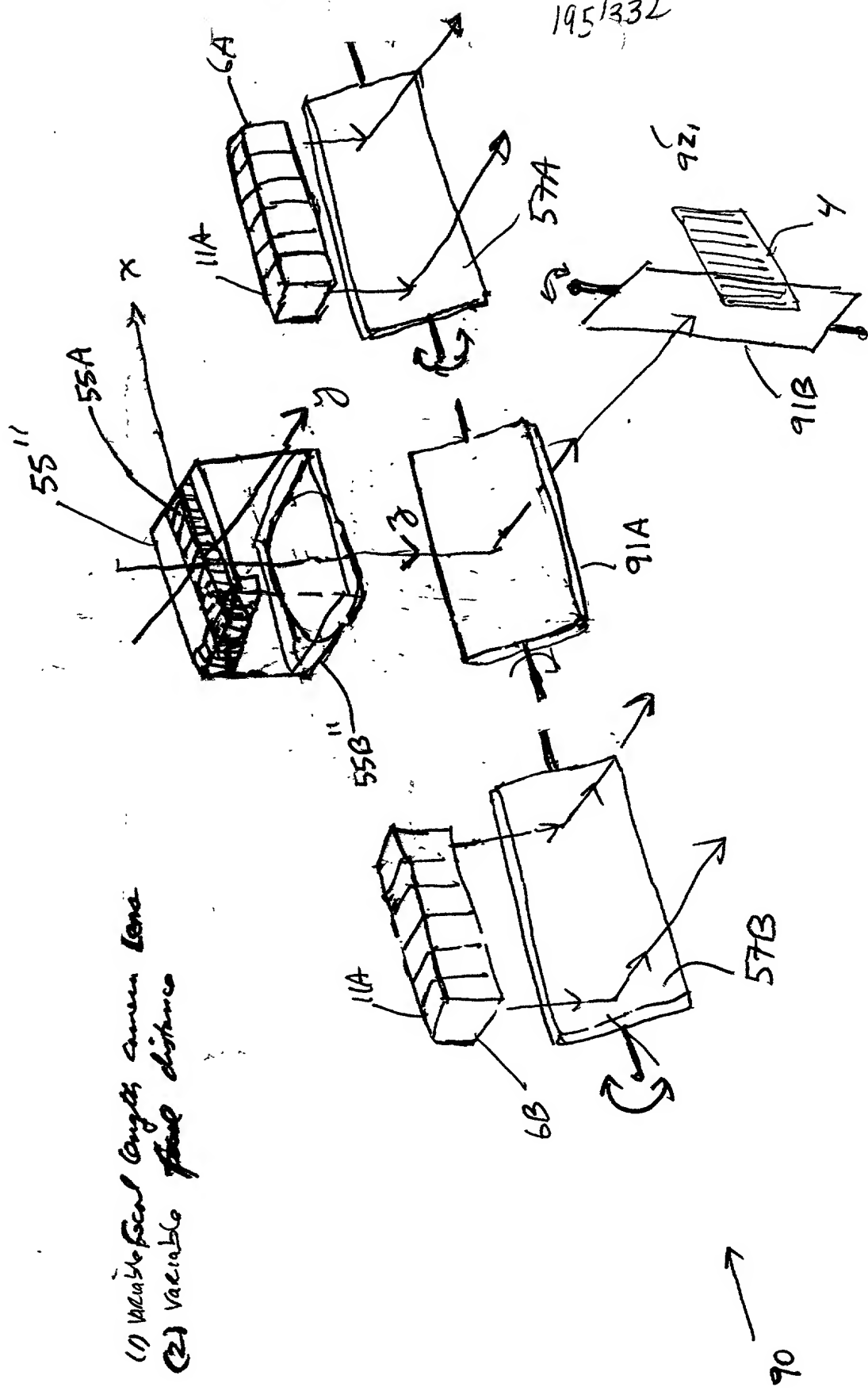


FIG 6E1



(1) Variable focal length lens  
(2) Variable focal distance

FIG. 6E2

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Patented Oct 2, 2001

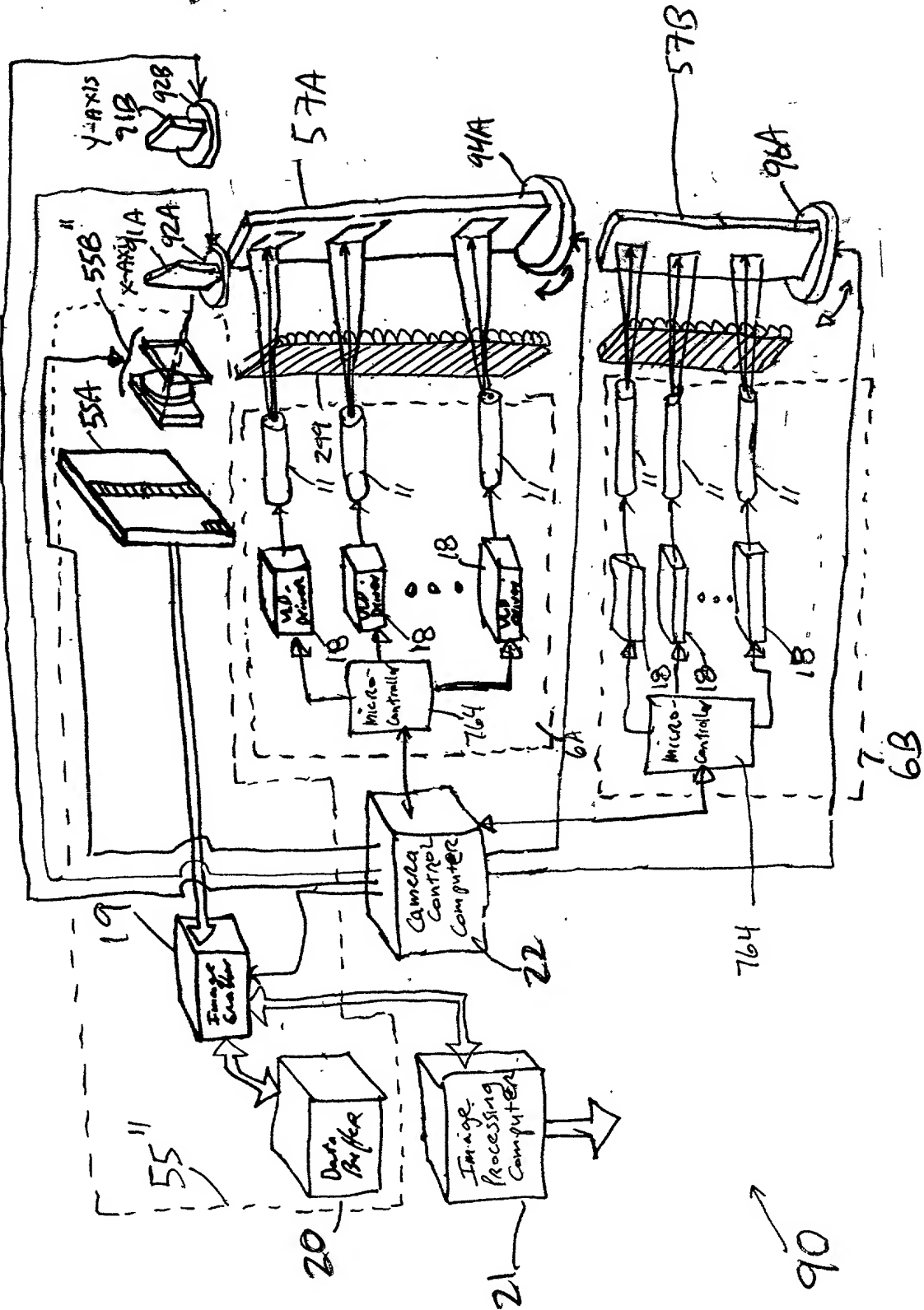


FIG. 6E3

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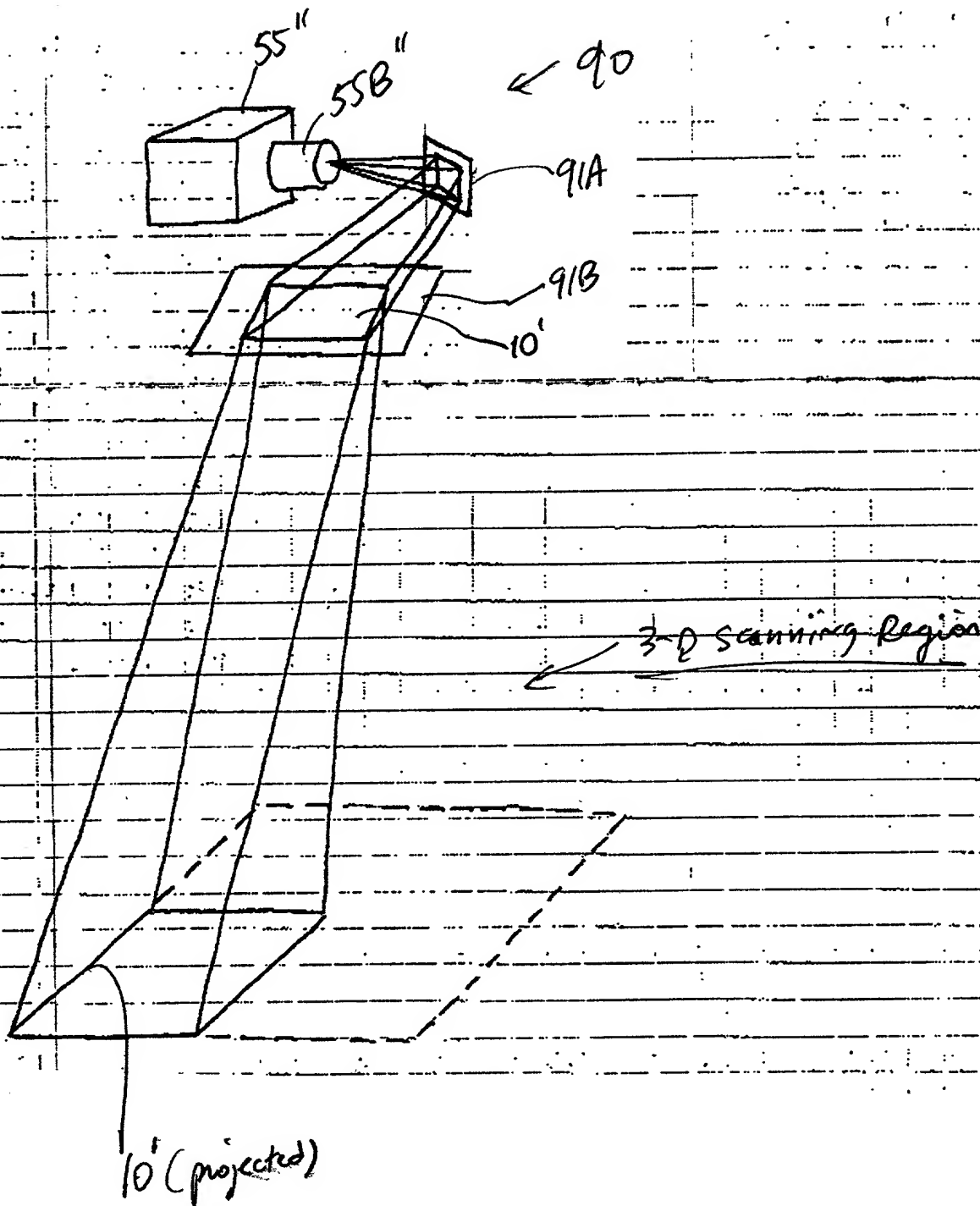


FIG. 6E4



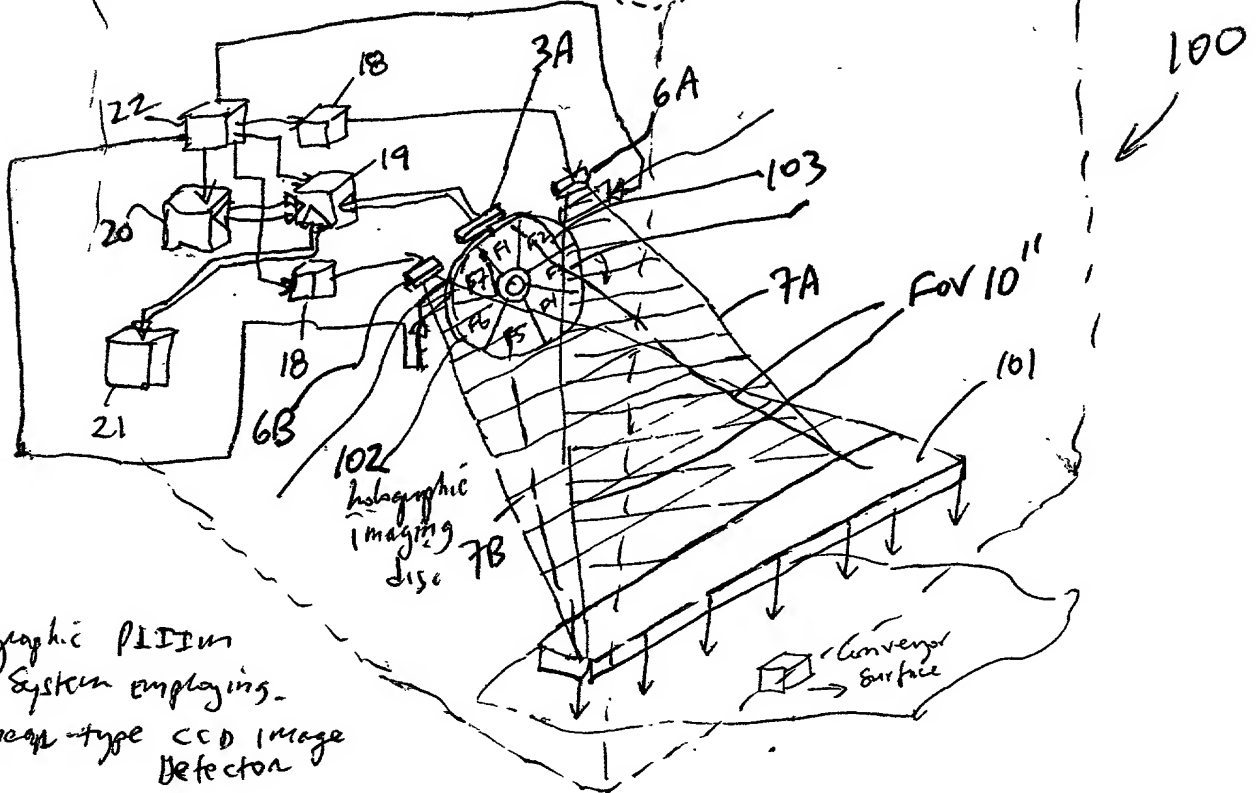


FIG. 7A

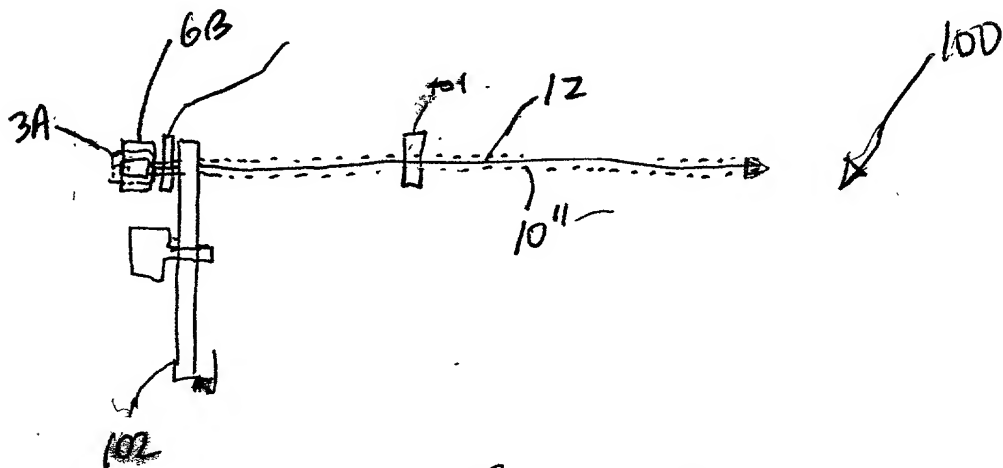


FIG. 7B

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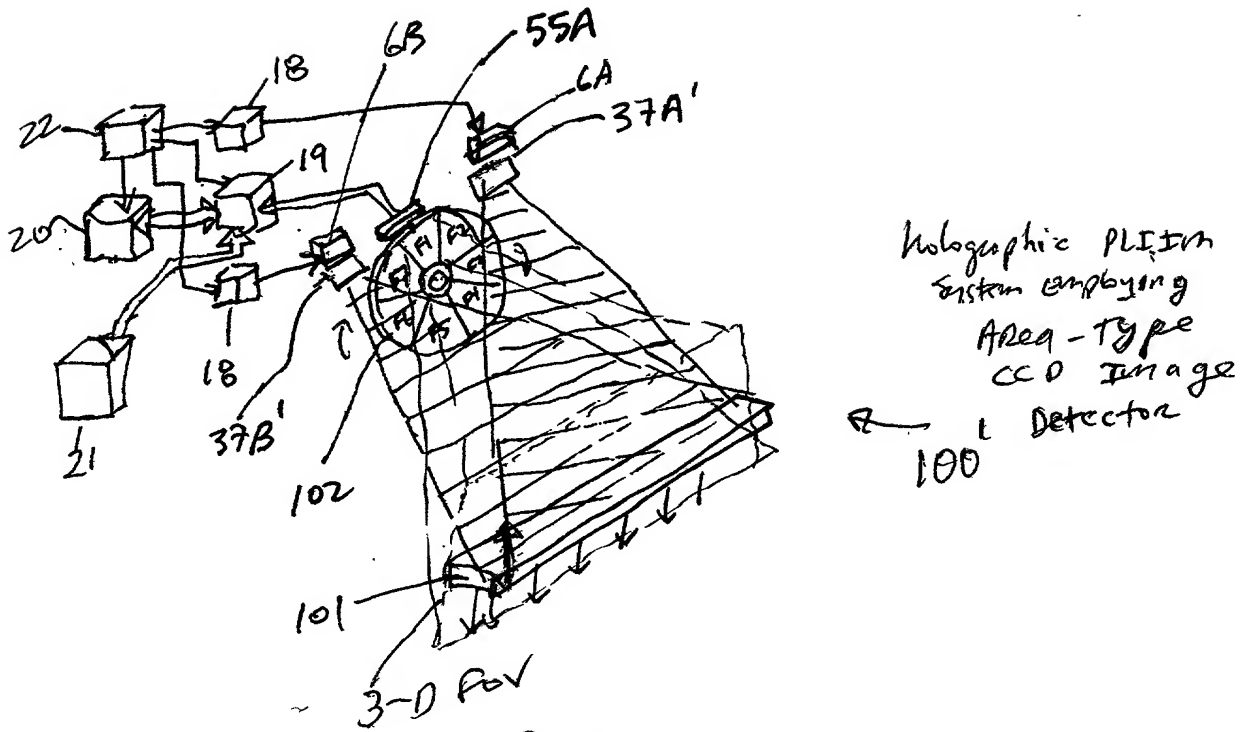


FIG. 8A

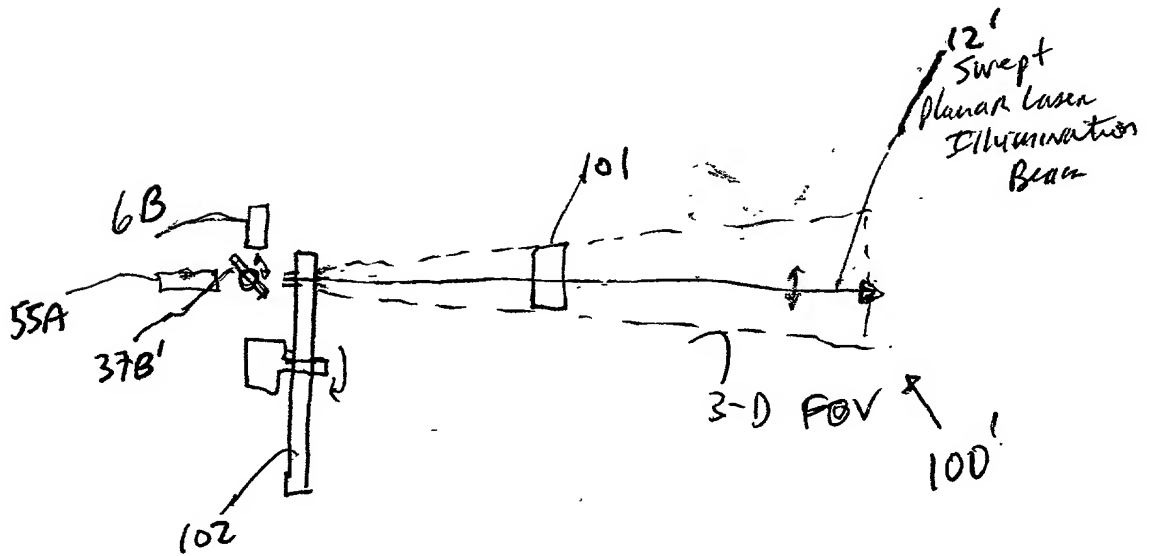


FIG. 8B

1-D CCD SCANNER EMBODIMENT

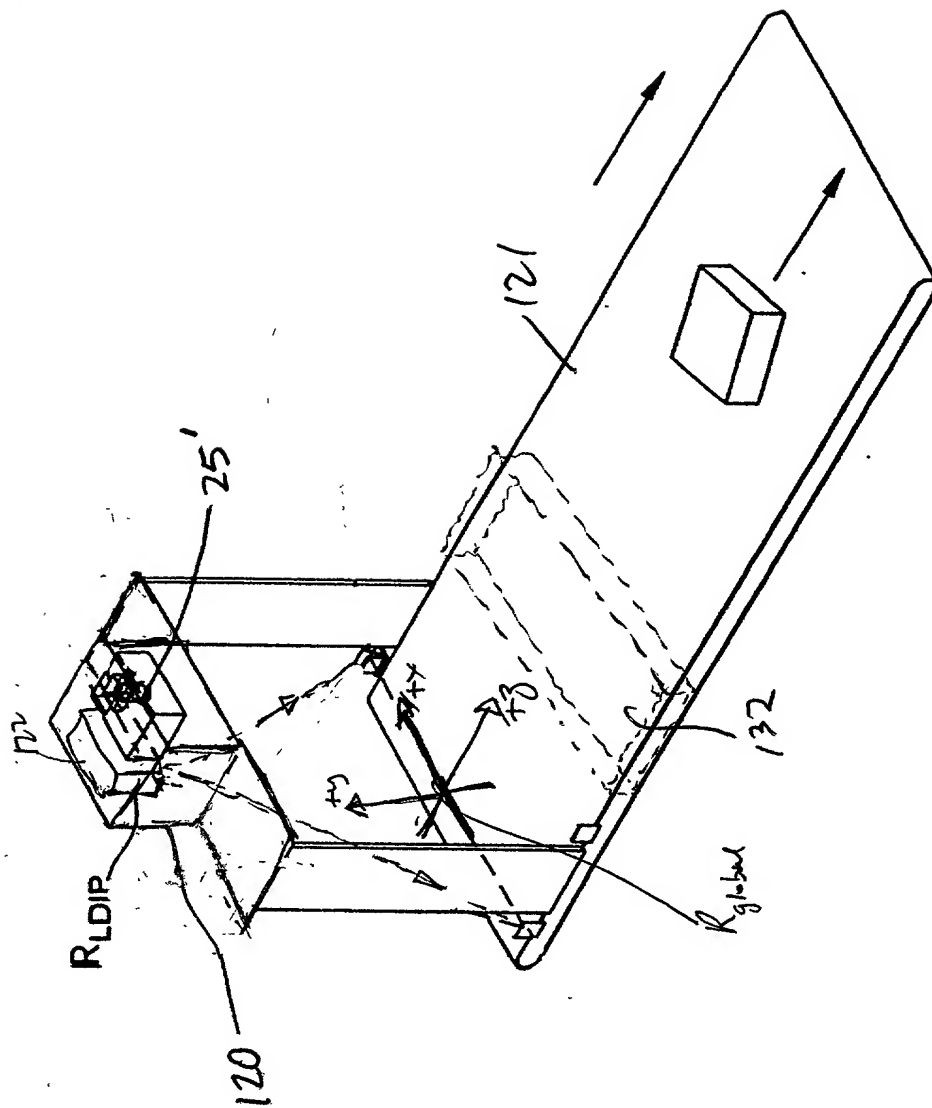


FIG. 9

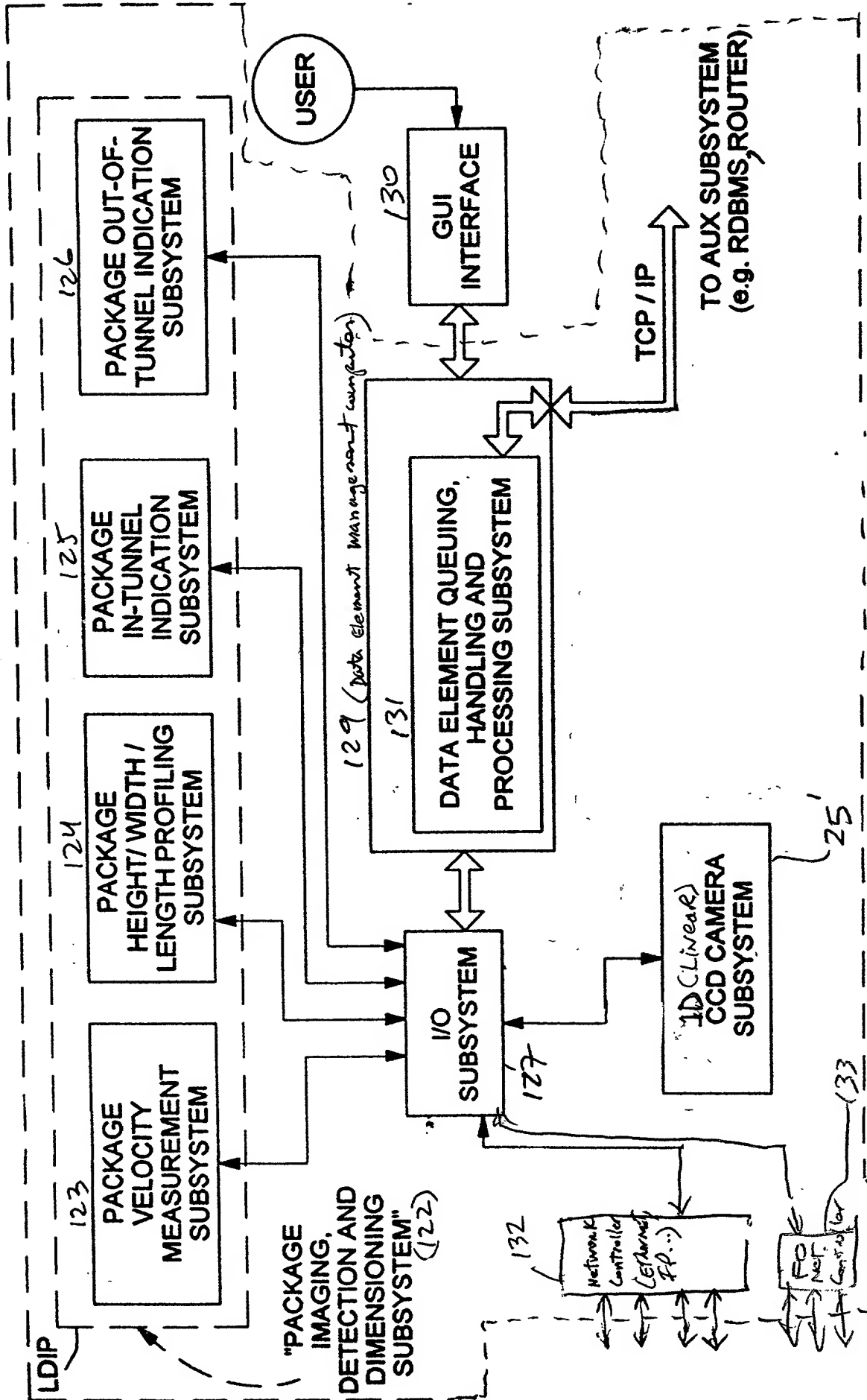


FIG. 10

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FIG. 11

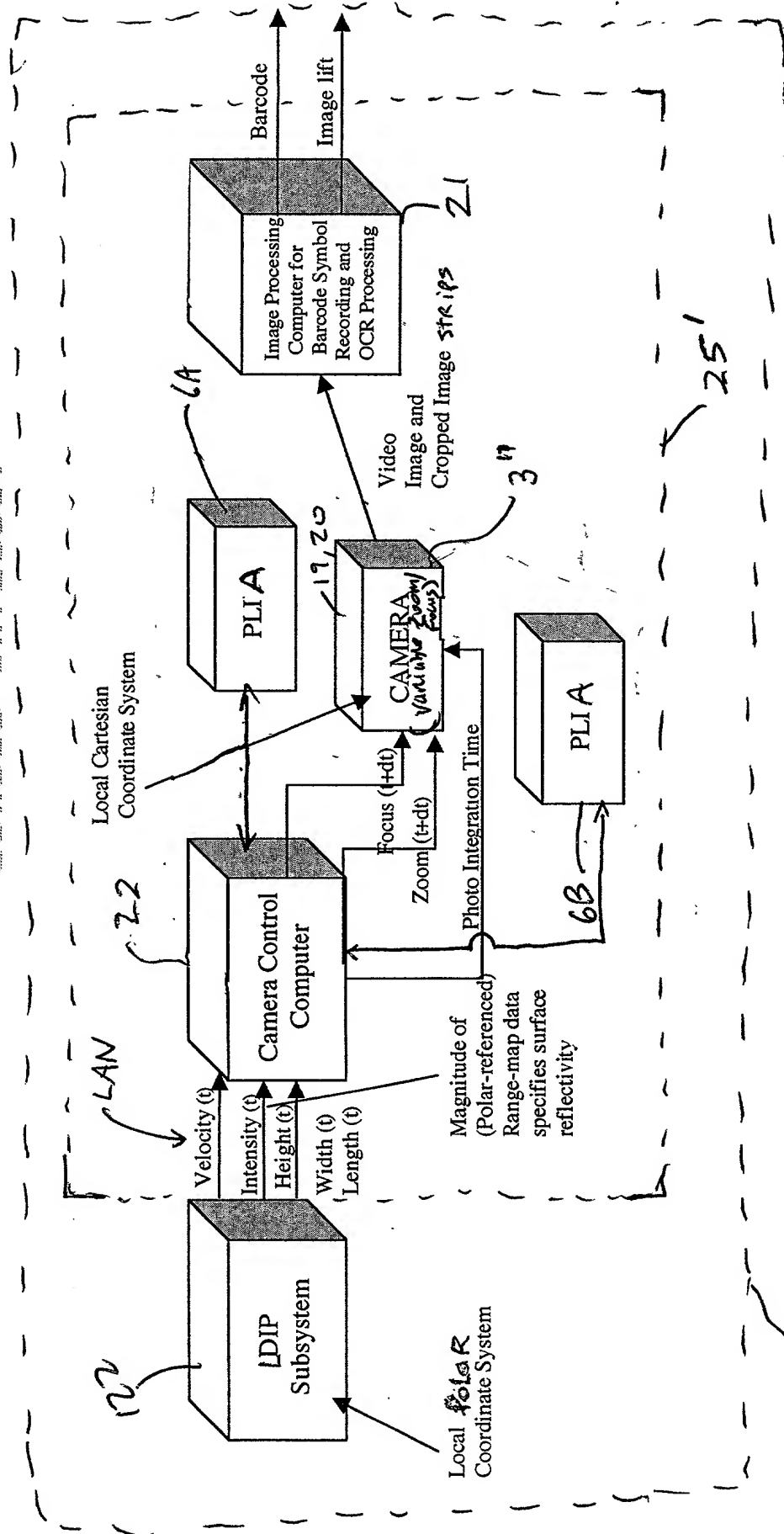


FIG. 11

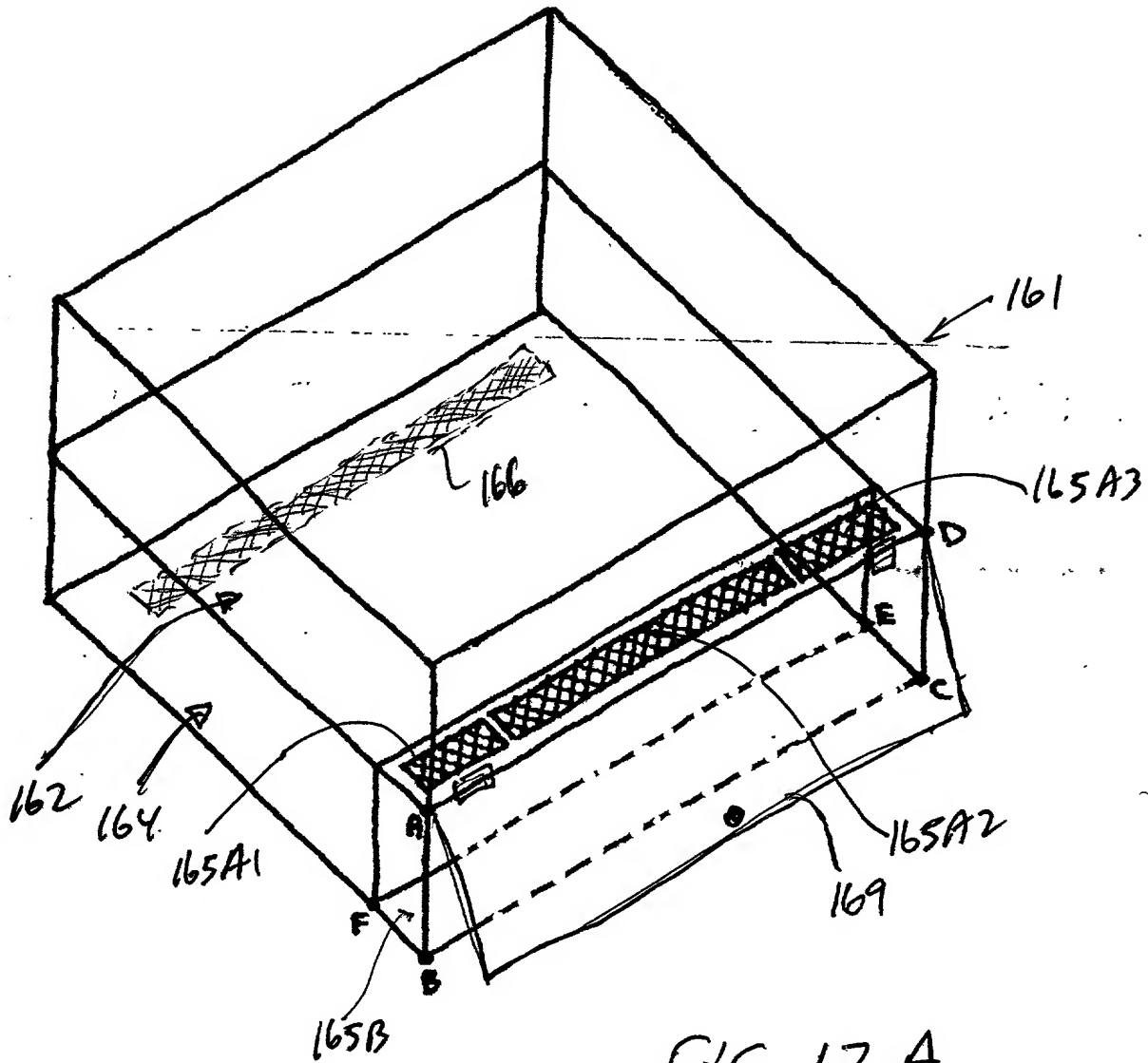


FIG. 12A

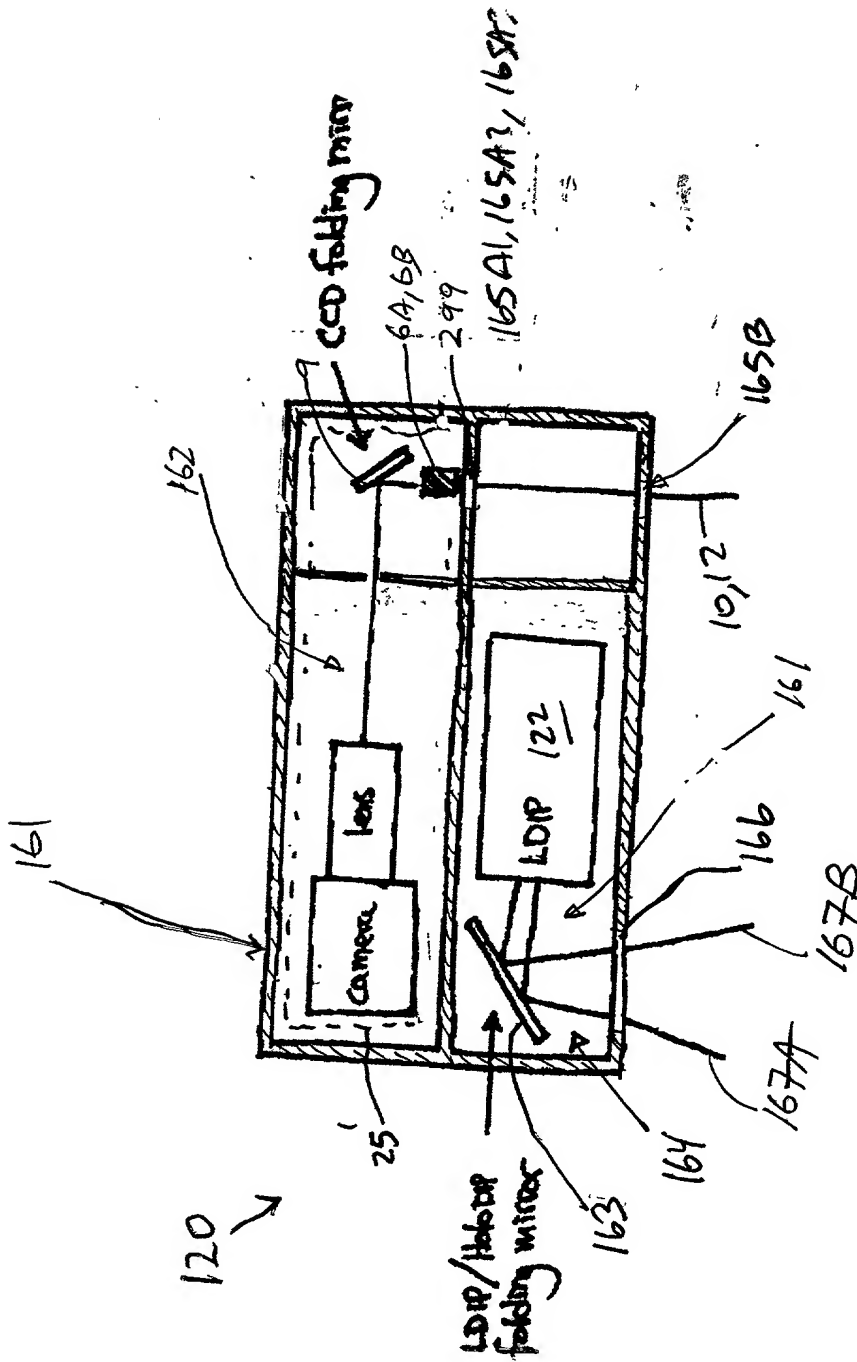


FIG. 12B

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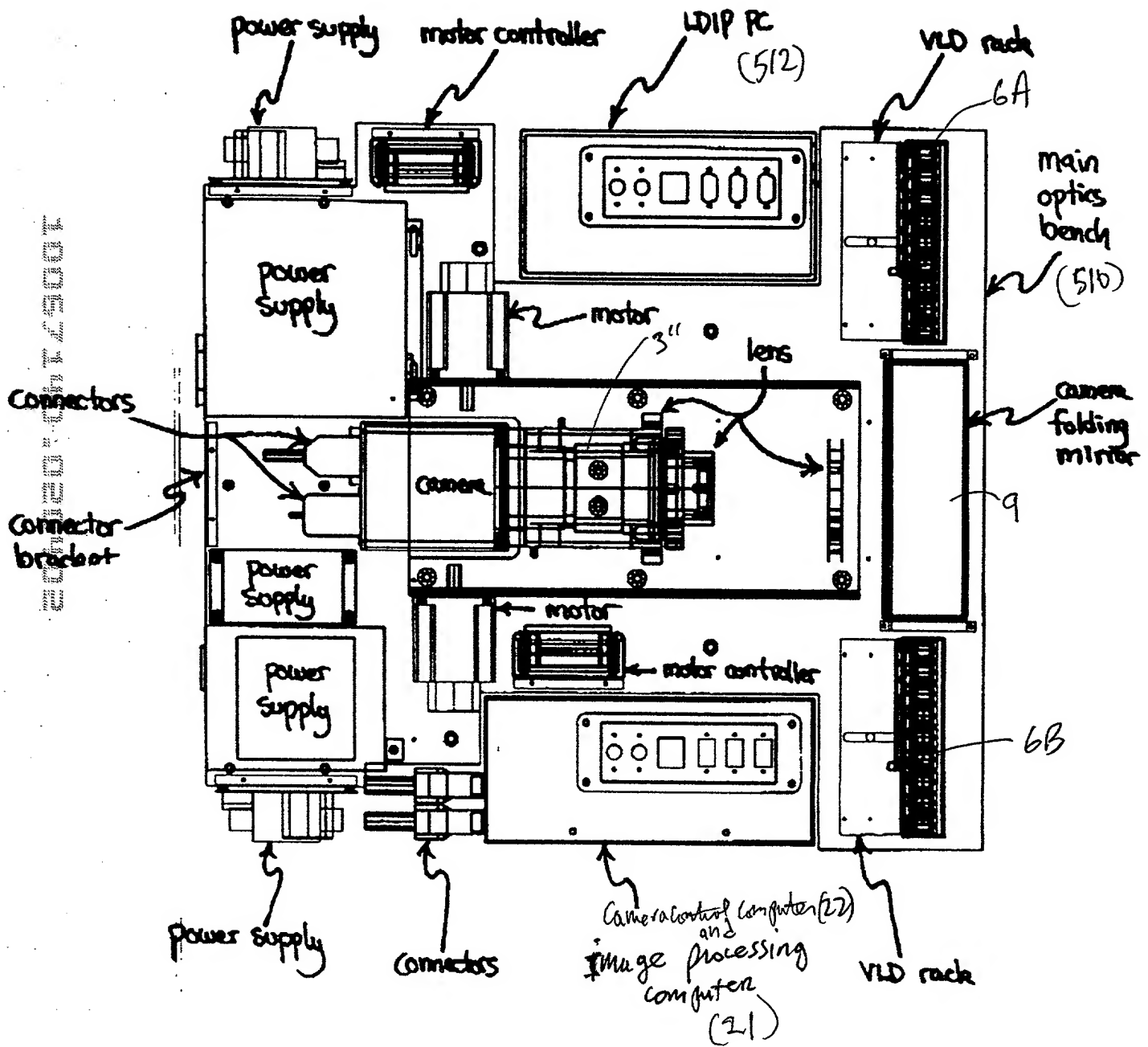


FIG. 12C



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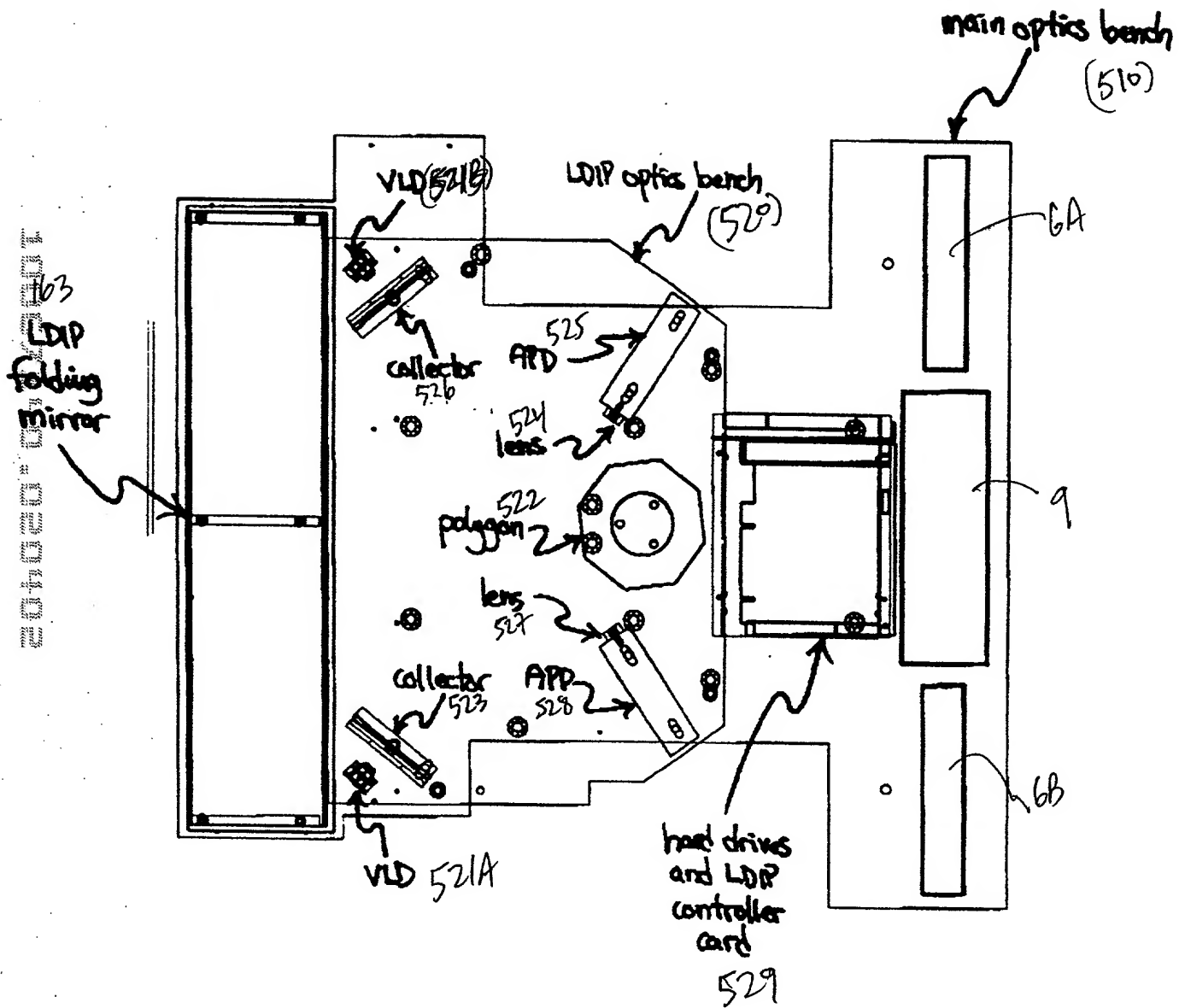
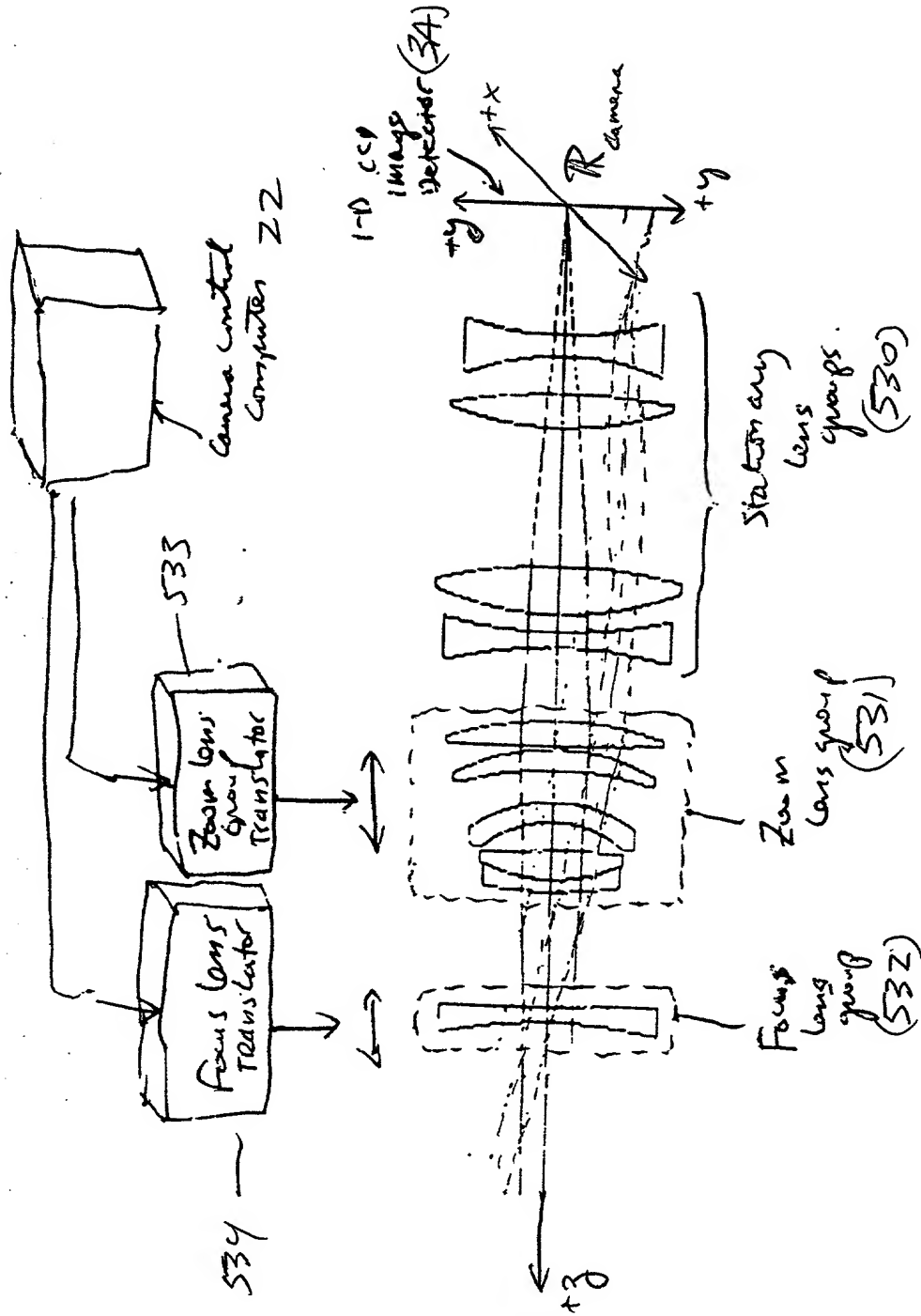


FIG. 12D

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(main optics)  
(lens groups)

FIG. 12E

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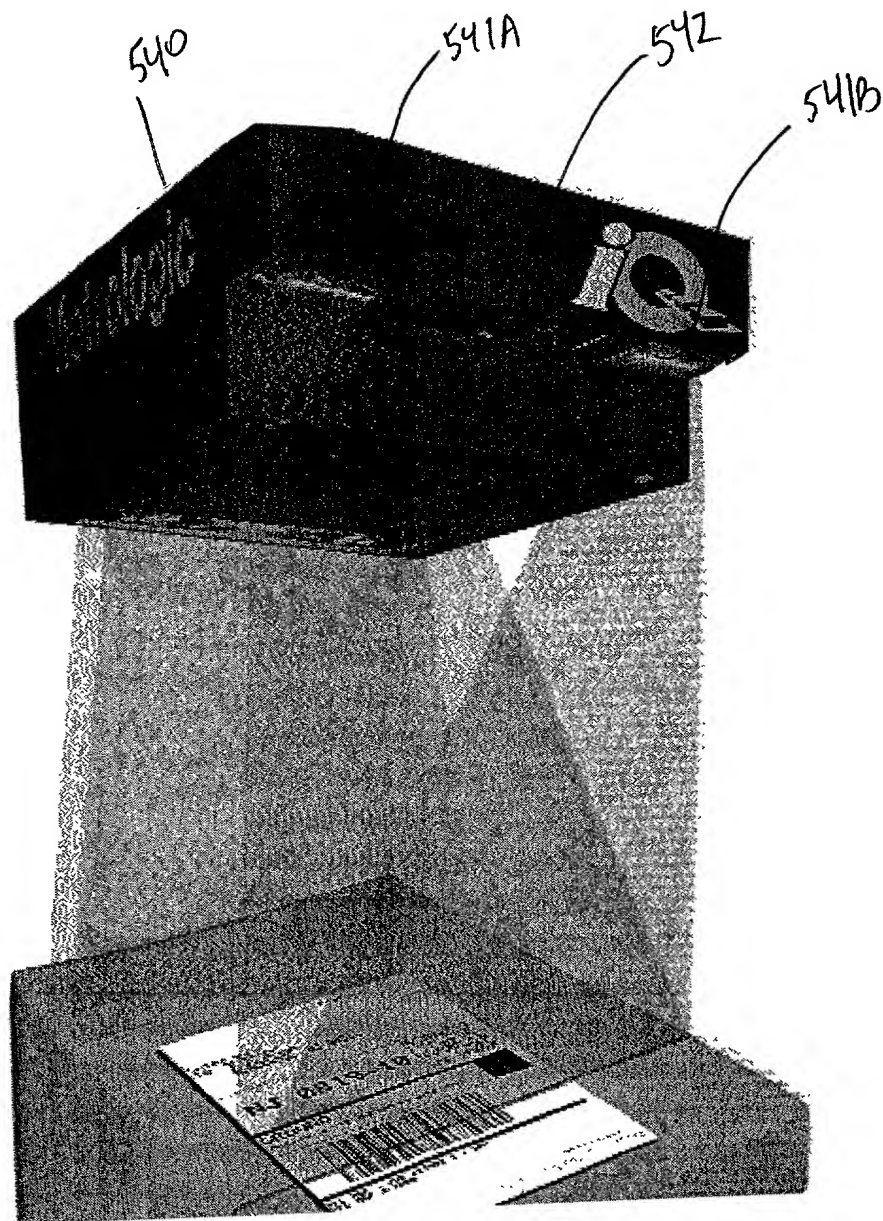


FIG. 13A

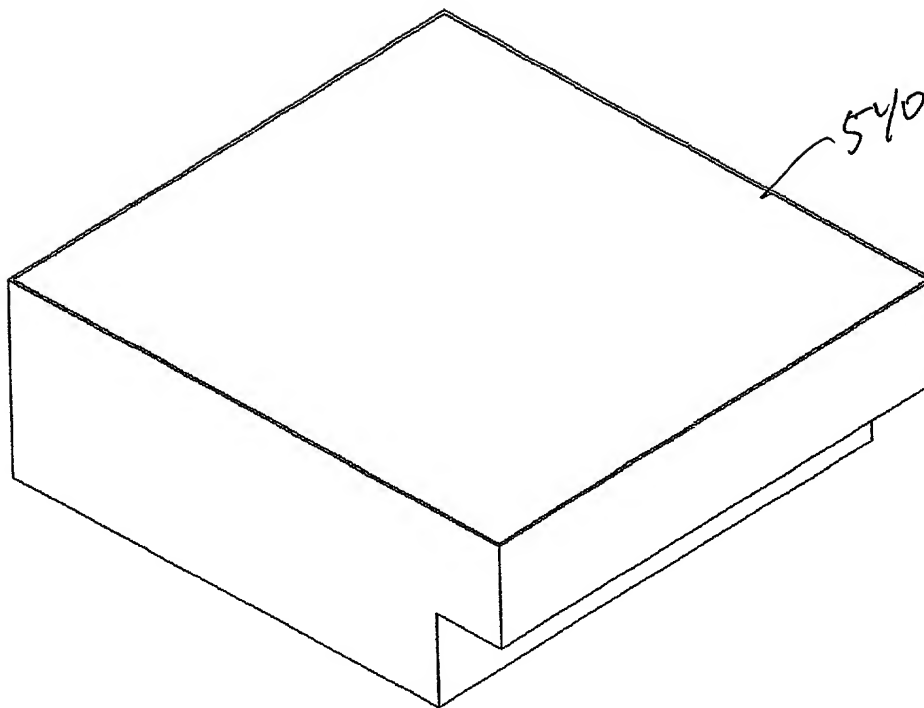


FIG. 13B

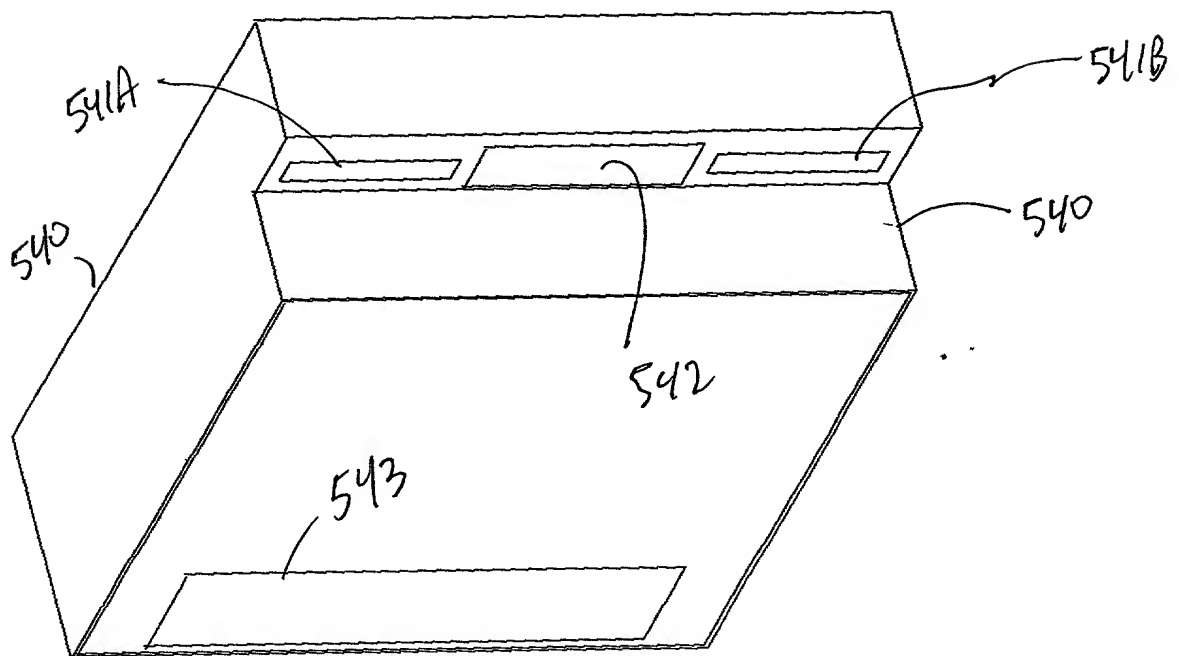


FIG. 13C

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## PLLIM-BASED PACKAGE IDENTIFICATION AND DIMENSIONING (PID) SYSTEM

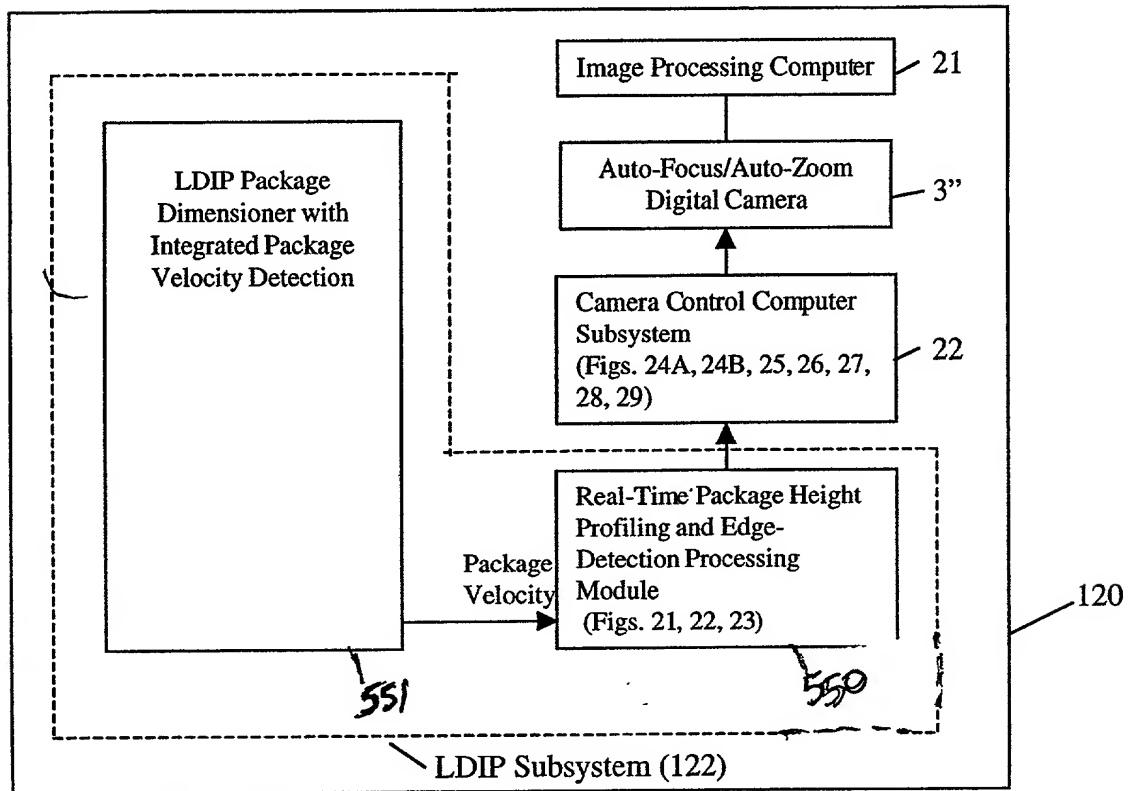


FIG. 14

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# LDIP REAL-TIME PACKAGE HEIGHT PROFILE AND EDGE DETECTION METHOD

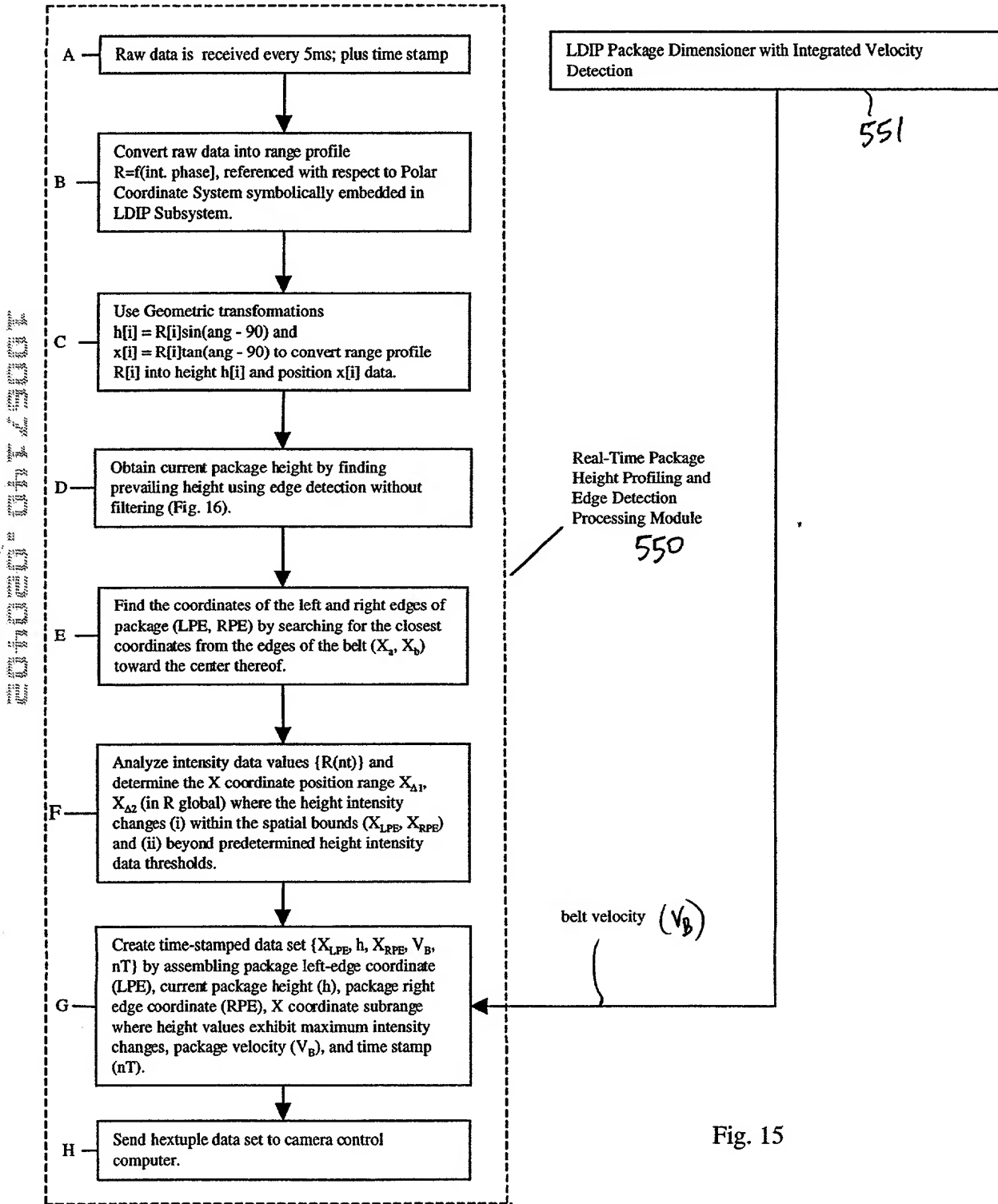
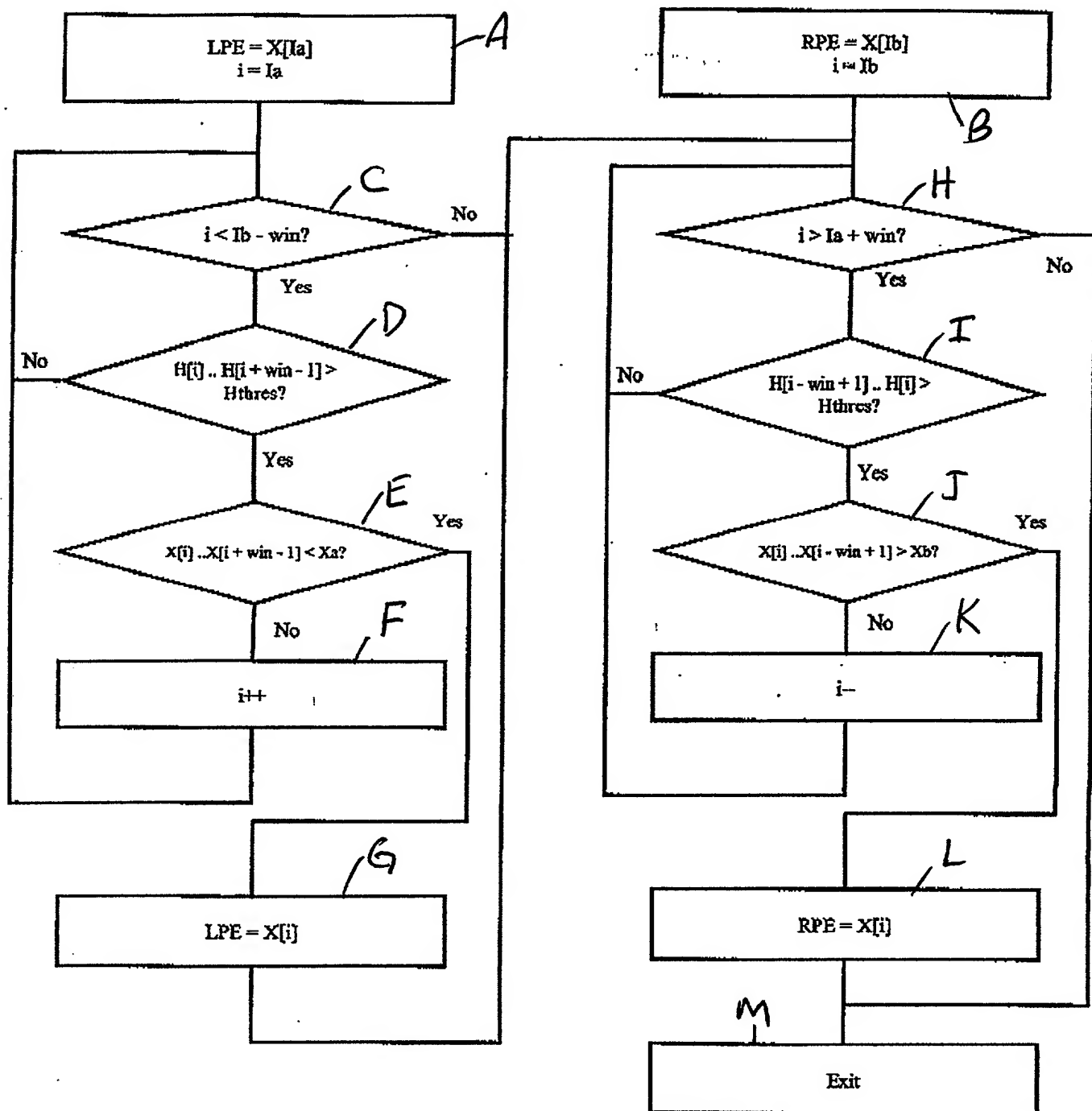


Fig. 15

## LDIP Real Time Package Edge Detection



$Xa$  = location of belt left edge;  $Xb$  = location of belt right edge  
 $Ia$  = belt edge edge pixel;  $Ib$  = belt right edge pixel  
 $LPE$  = Left package edge;  $RPE$  = Right package edge  
 $H[]$  = Pixel height array;  $X[]$  = Pixel location array  
 $win$  = package detection window

FIG. 16

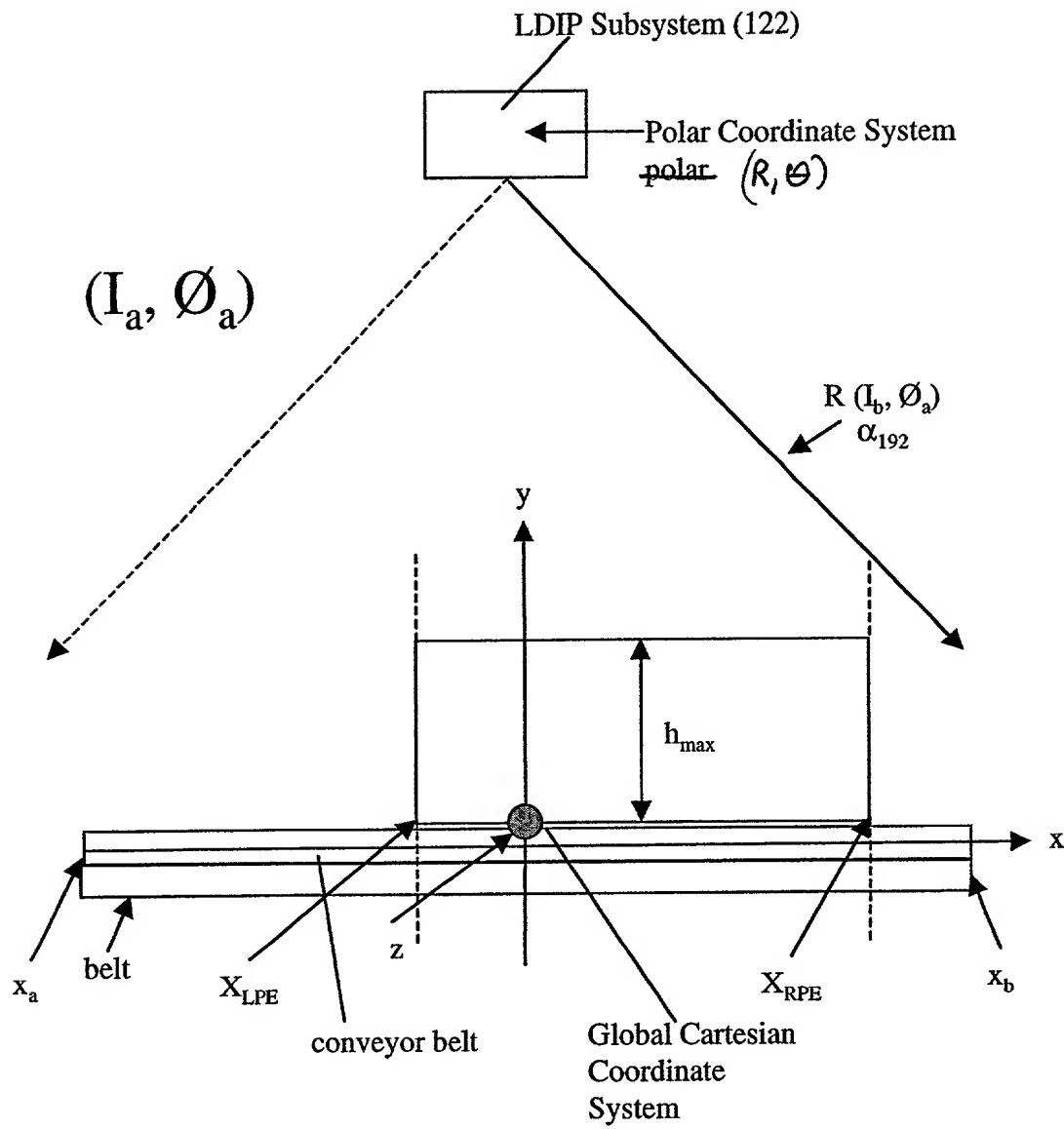


Fig. 17



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# INFORMATION MEASURED AT SCAN ANGLES BEFORE COORDINATE TRANSFORMS

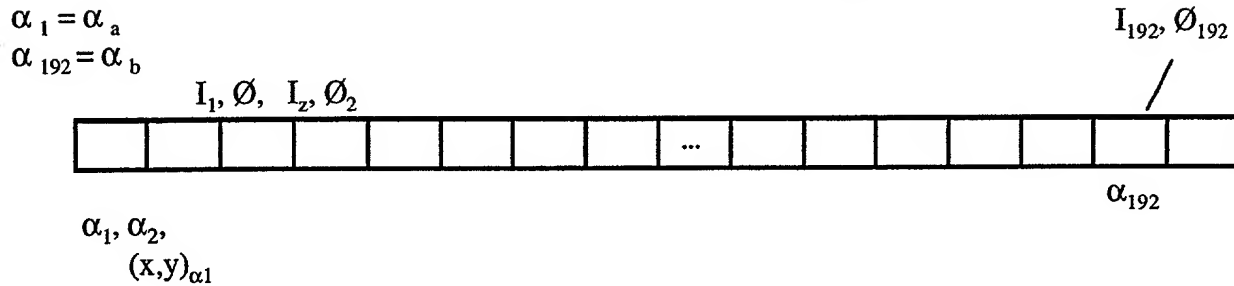


Fig. 17A

## RANGE AND POLAR ANGLE MEASURES TAKEN AT SCAN ANGLE $\alpha$ BEFORE COORDINATE TRANSFORMS

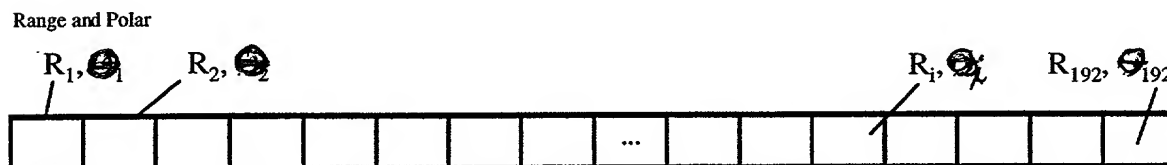


Fig. 17B

## MEASURED PACKAGE HEIGHT AND POSITION VALUES AFTER COORDINATE TRANSFORMS

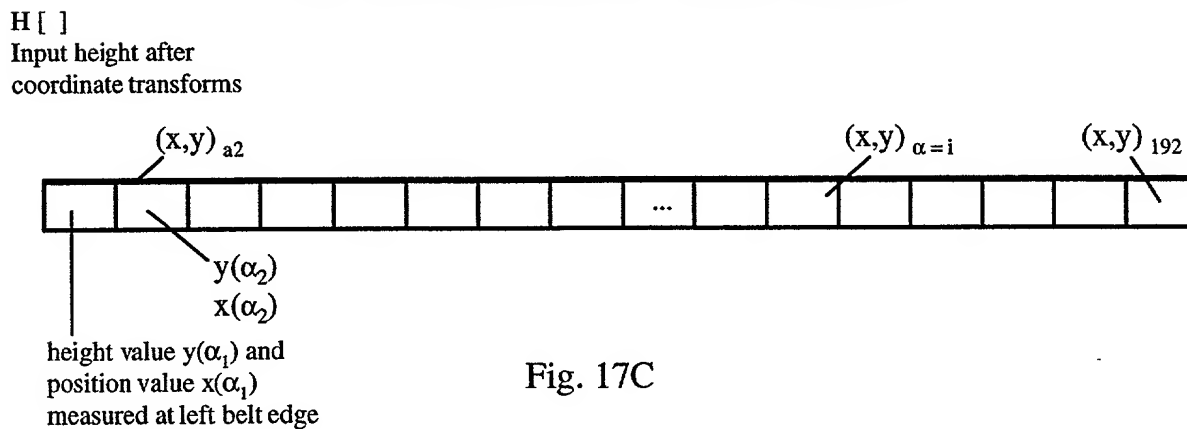


Fig. 17C

# CAMERA CONTROL PROCESS CARRIED OUT WITHIN THE CAMERA CONTROL SUBSYSTEM OF EACH OBJECT ATTRIBUTE ACQUISITION AND ANALYSIS SYSTEM

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Start

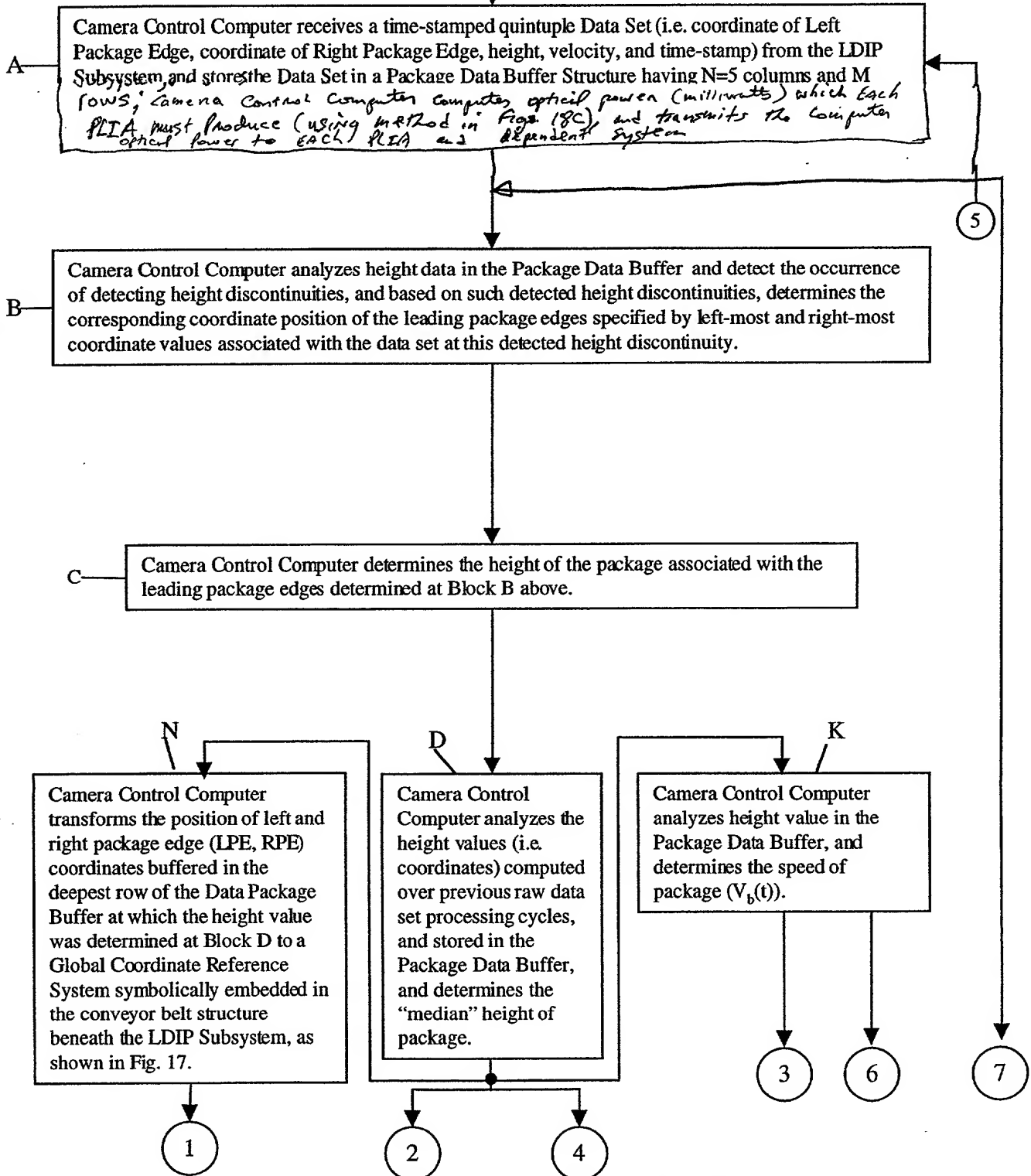


Fig. 18A

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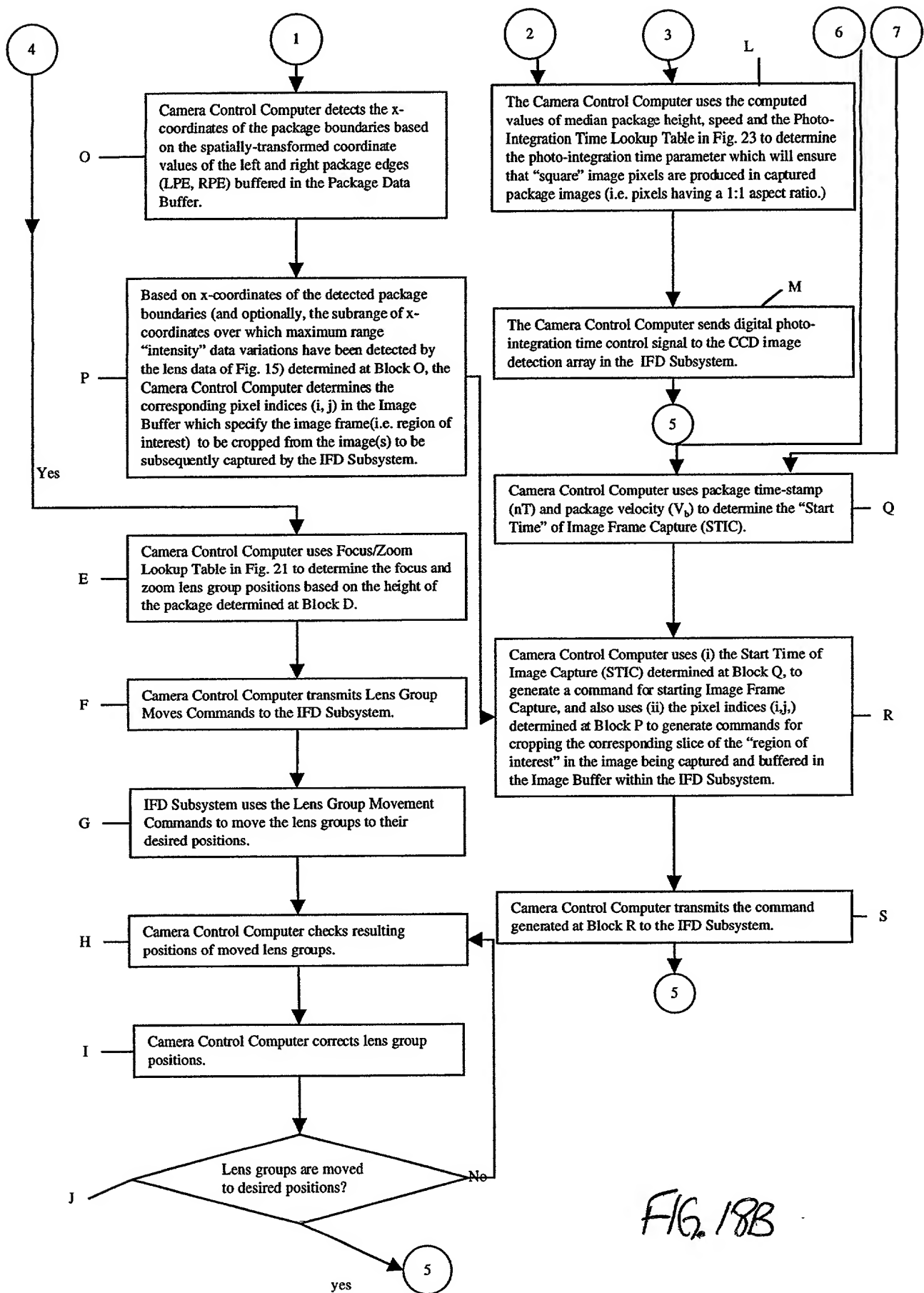


FIG. 18B

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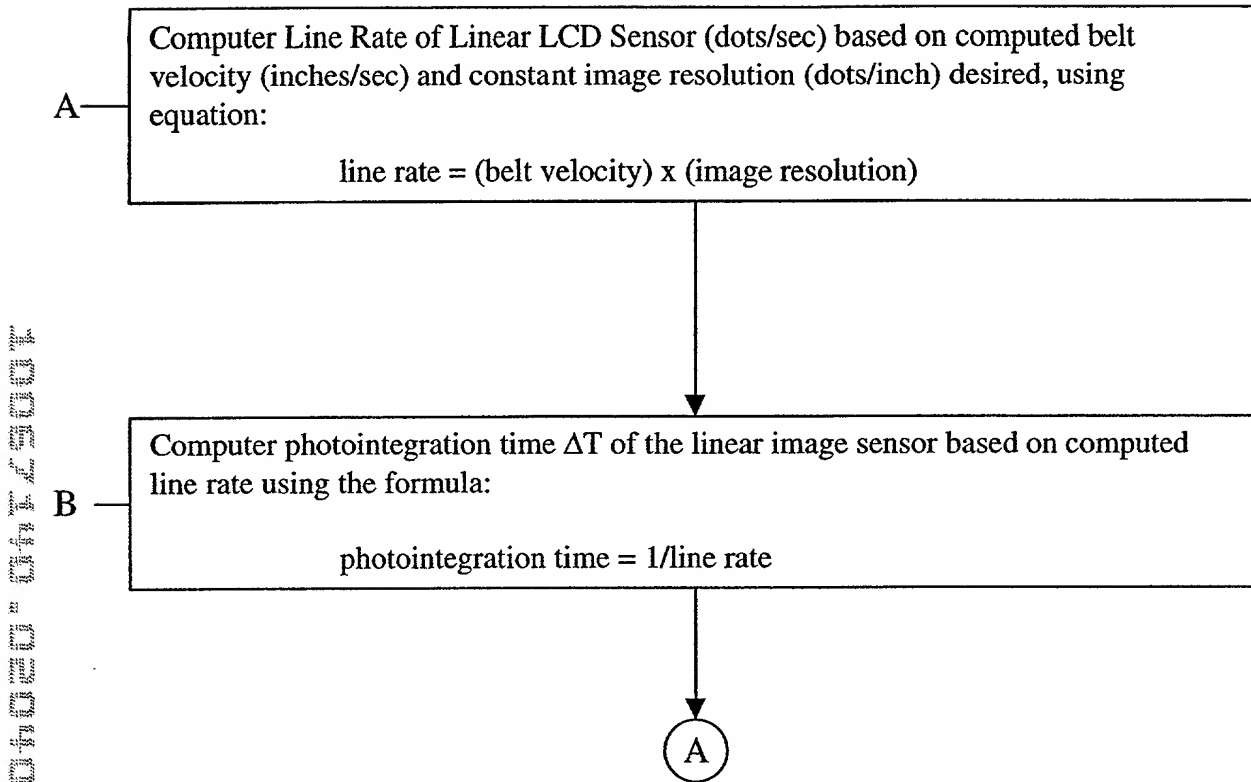


Fig. 18C1

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Compute optical power (milliwatts) of each PLIA based on computed photointegration time ( $\Delta T$ ) using the following formula:

$$\text{optical power of LD (milliwatts)} = \frac{\text{constant}}{\text{photointegration time } \Delta T}$$

Fig. 18C2

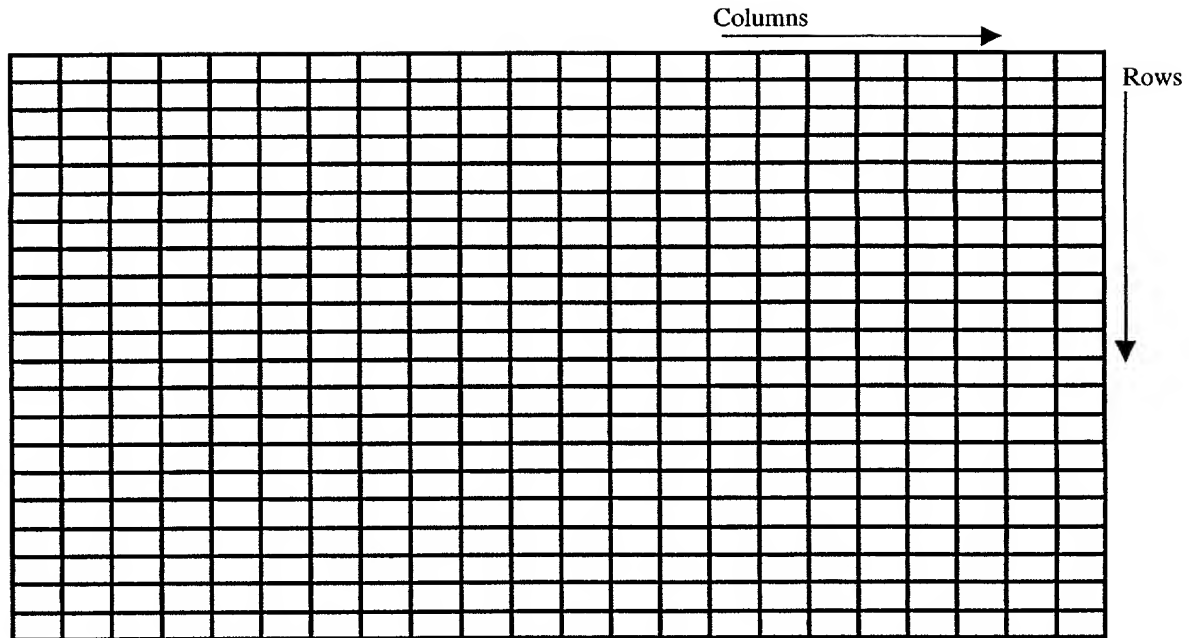
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X coordinate subrange where  
maximum range "intensity"  
variations have been detected

Left Package Edge (LDE)	Package Height (h)	Right Package Edge (RPE)	Package Velocity	Time-stamp (nT)	
					Row 1
					Row 2
					Row 3
					Row 4
					Row 5
					Row M

Package Data Buffer (FIFO)

Fig. 19



Camera Pixel Data Buffer  
pixel indices (i,j)

Fig. 20

# Zoom and Focus Lens Group position Look-up Table

Distance from Camera H (mm)	Zoom group distance (mm) Y (Zoom)	Focus group distance (mm) Y (Focus)
1000	21.57489228	2.47E-05
1100	19.38089696	10.99009783
1200	17.10673434	20.65783177
1300	14.77137314	29.10917002
1400	12.39153565	36.47312595
1500	9.979114358	42.87845436
1600	7.540639114	48.44003358
1700	5.078794775	53.25495831
1800	2.595989366	57.40834303
1900	0.099972739	60.98883615

(use interpolation techniques for working distances between listed points in table)

FIG. 21

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2010040404040404

\* Note: On focal distance & zoom (eff. focal length) in camera lens are coupled (inter-dependent) in camera has a fixed aperture F5.6

## Focus and Zoom lens movement vs. working distances

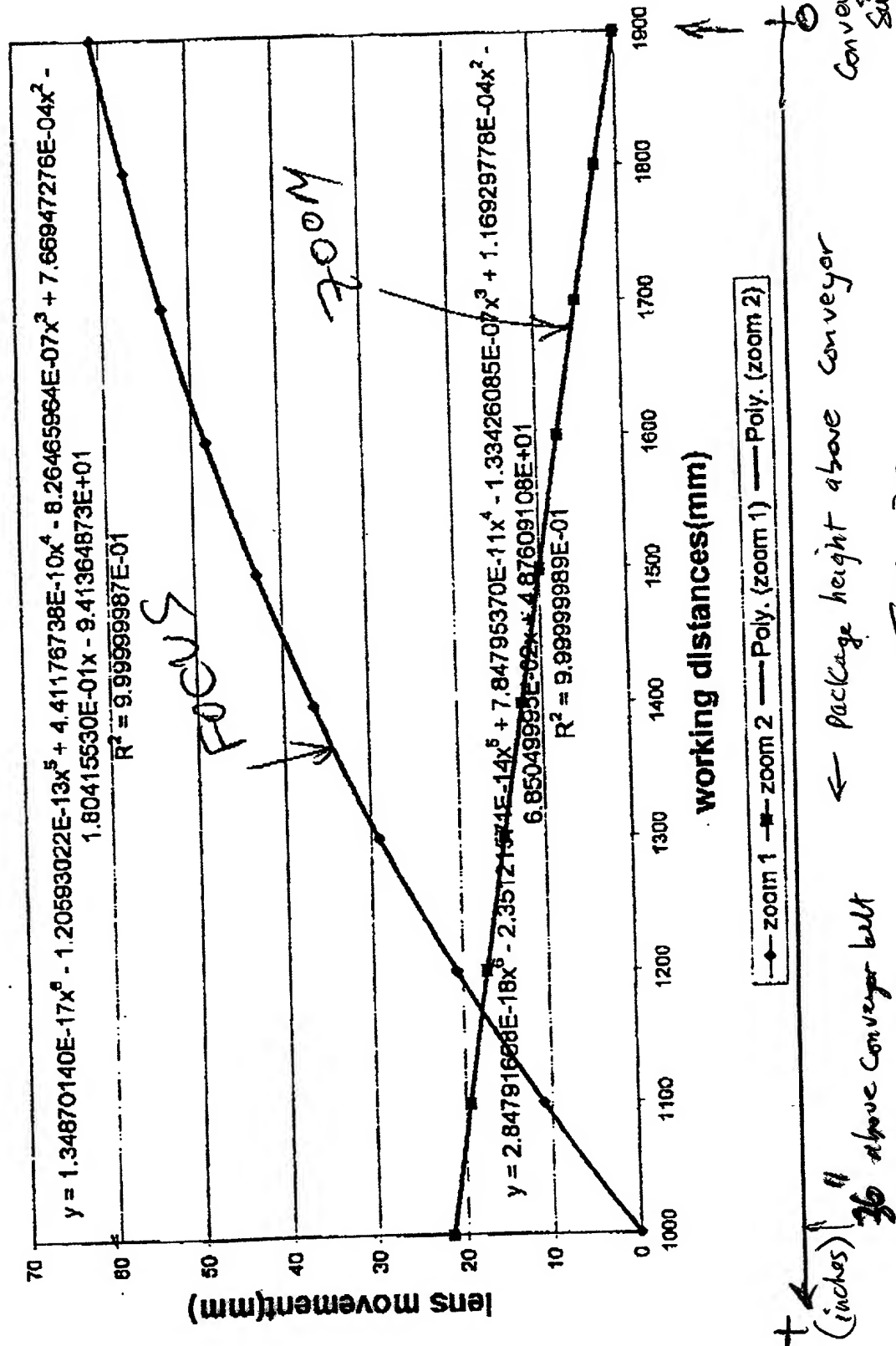


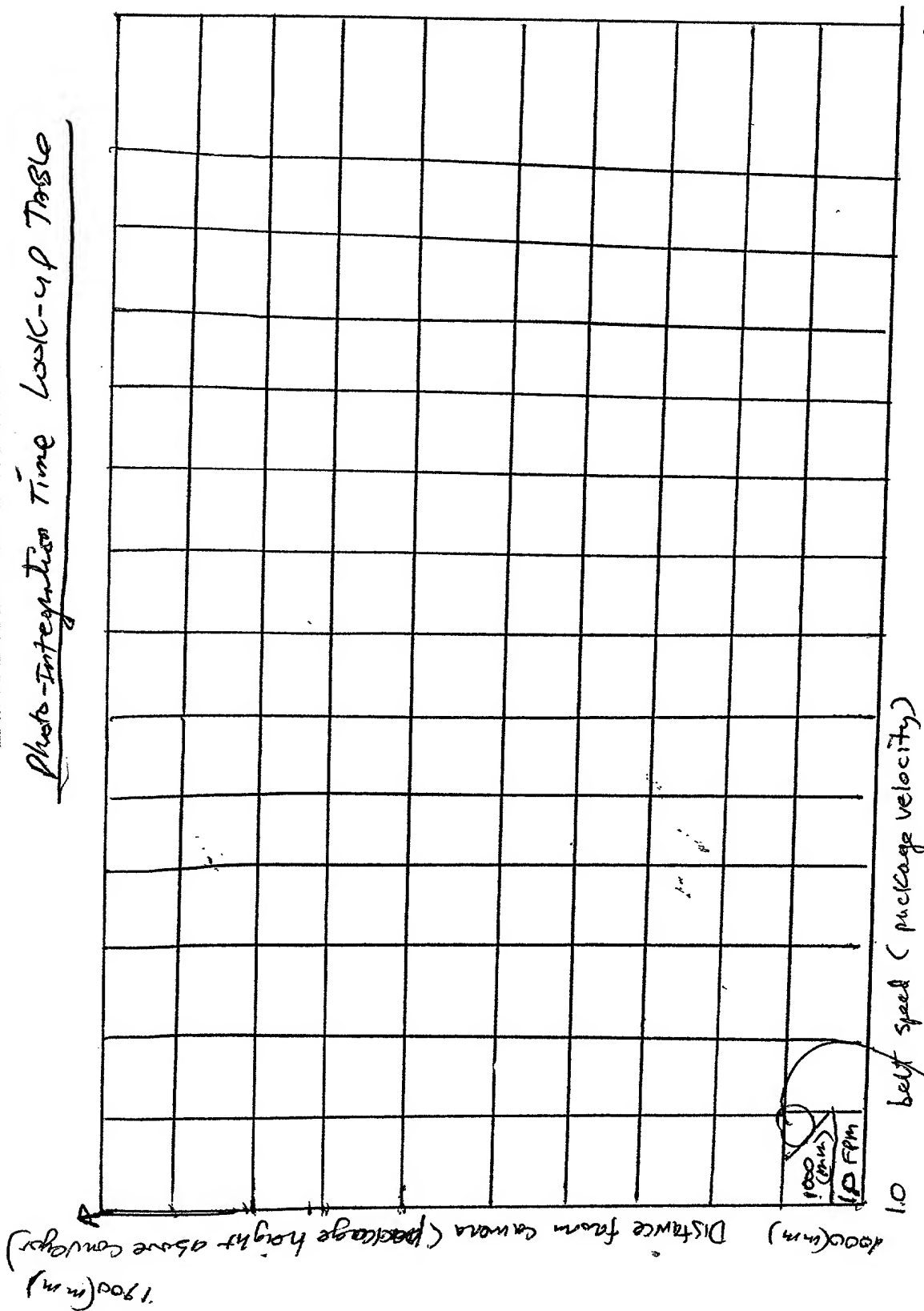
FIG. 22



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# Photo-Integration Time Look-Up Table



600 feet per minute  
(FPM)

FIG. 23

Photo-Integration  
Time value that  
Ensures square image pixels  
(1:1 aspect ratio)

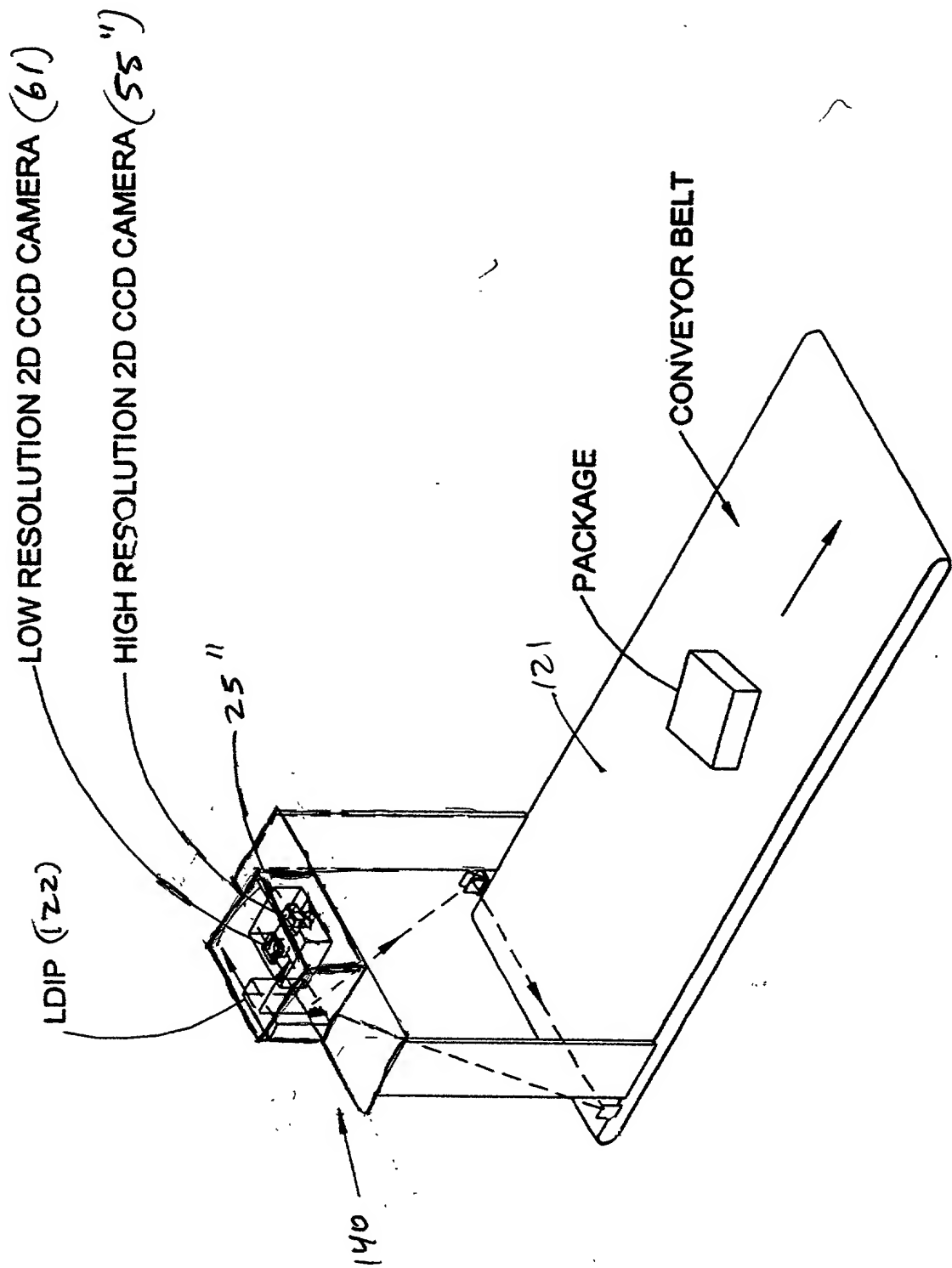


FIG 24

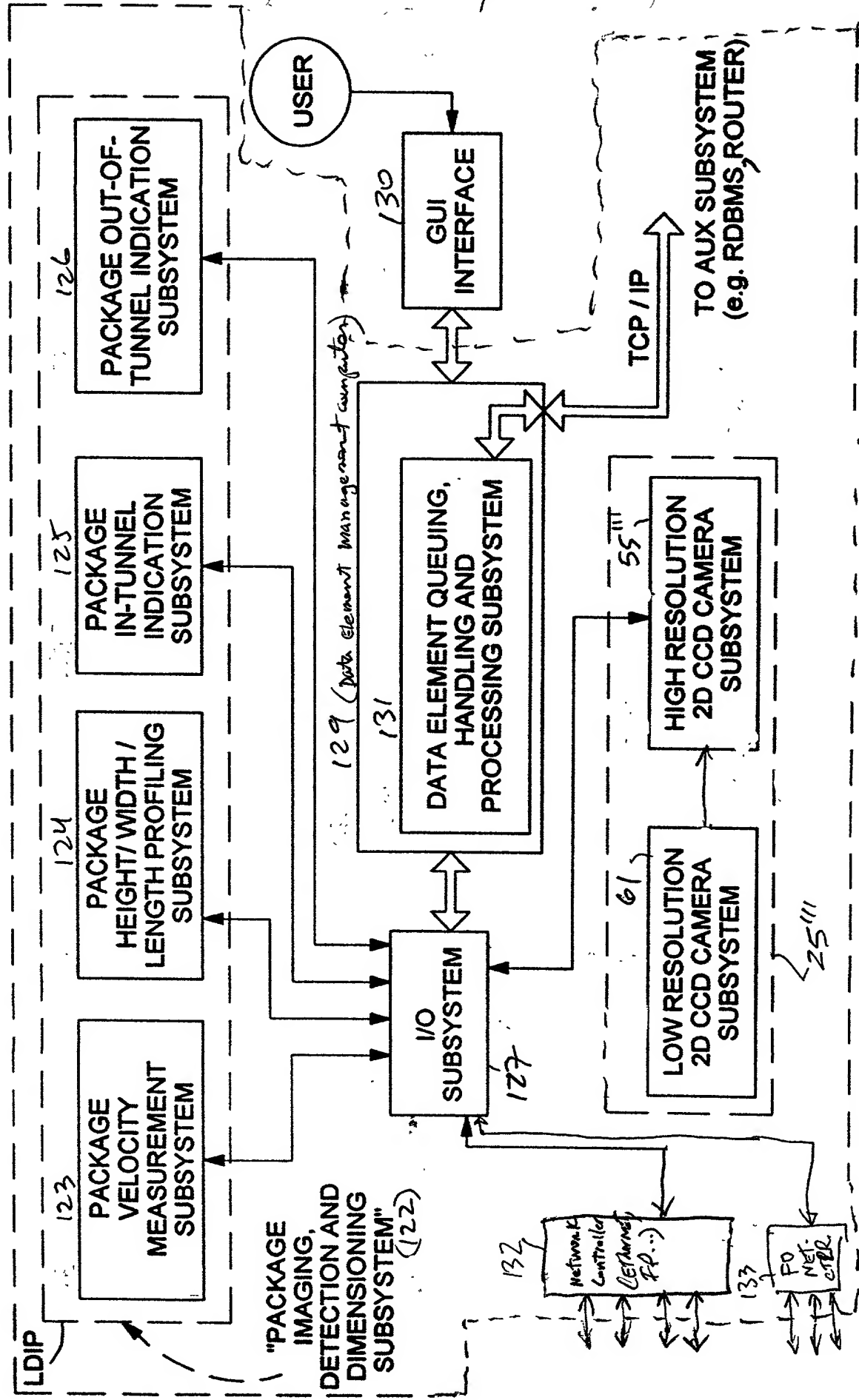


FIG. 25

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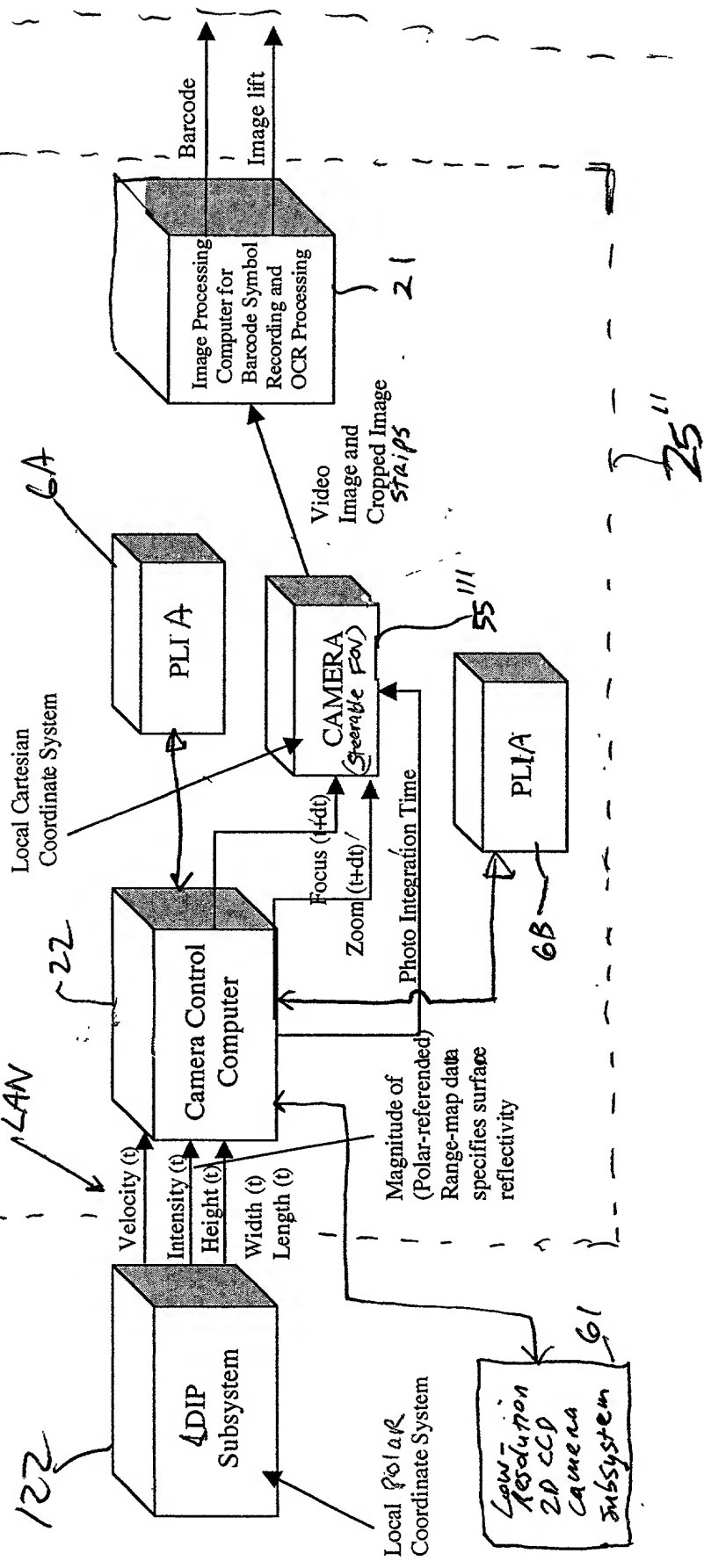
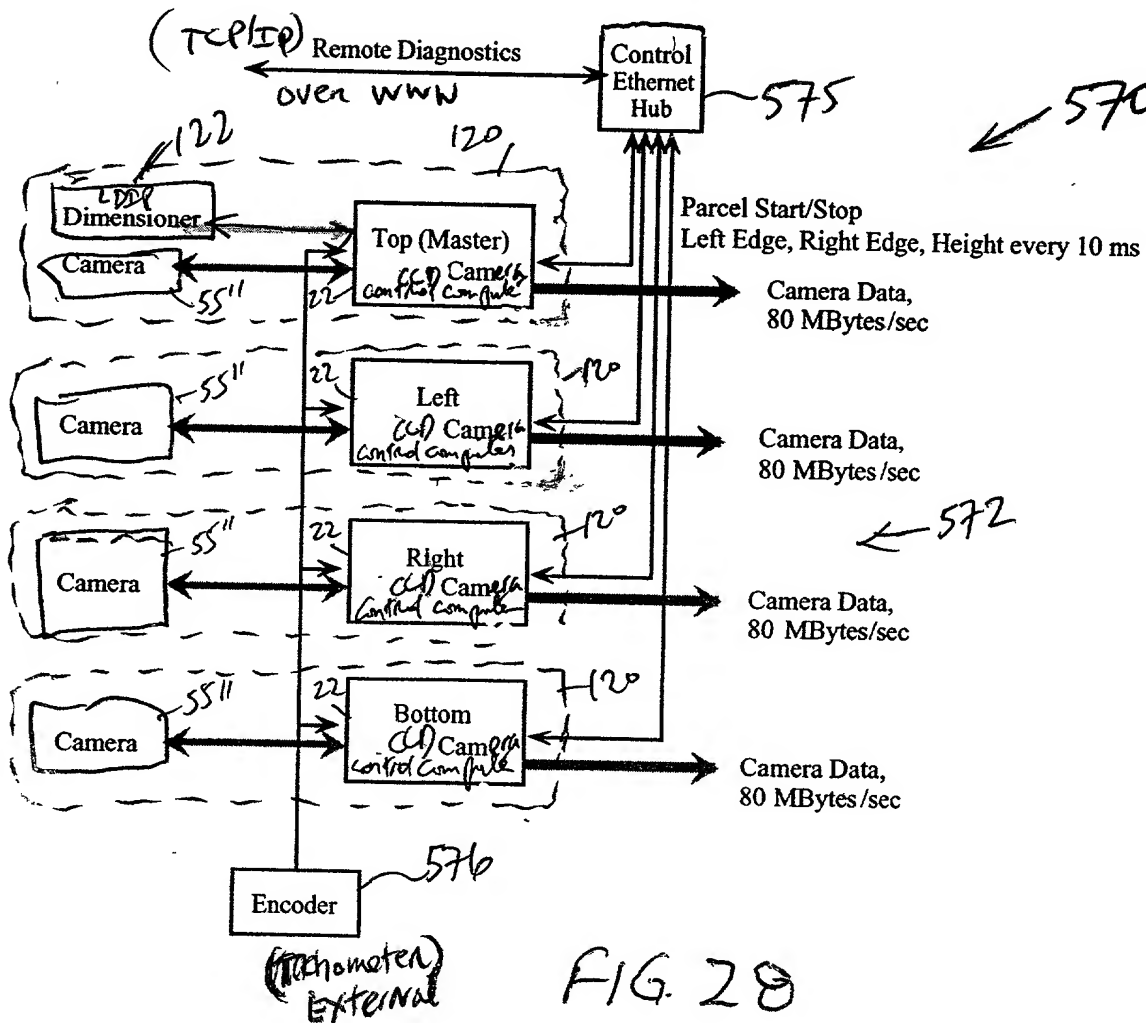
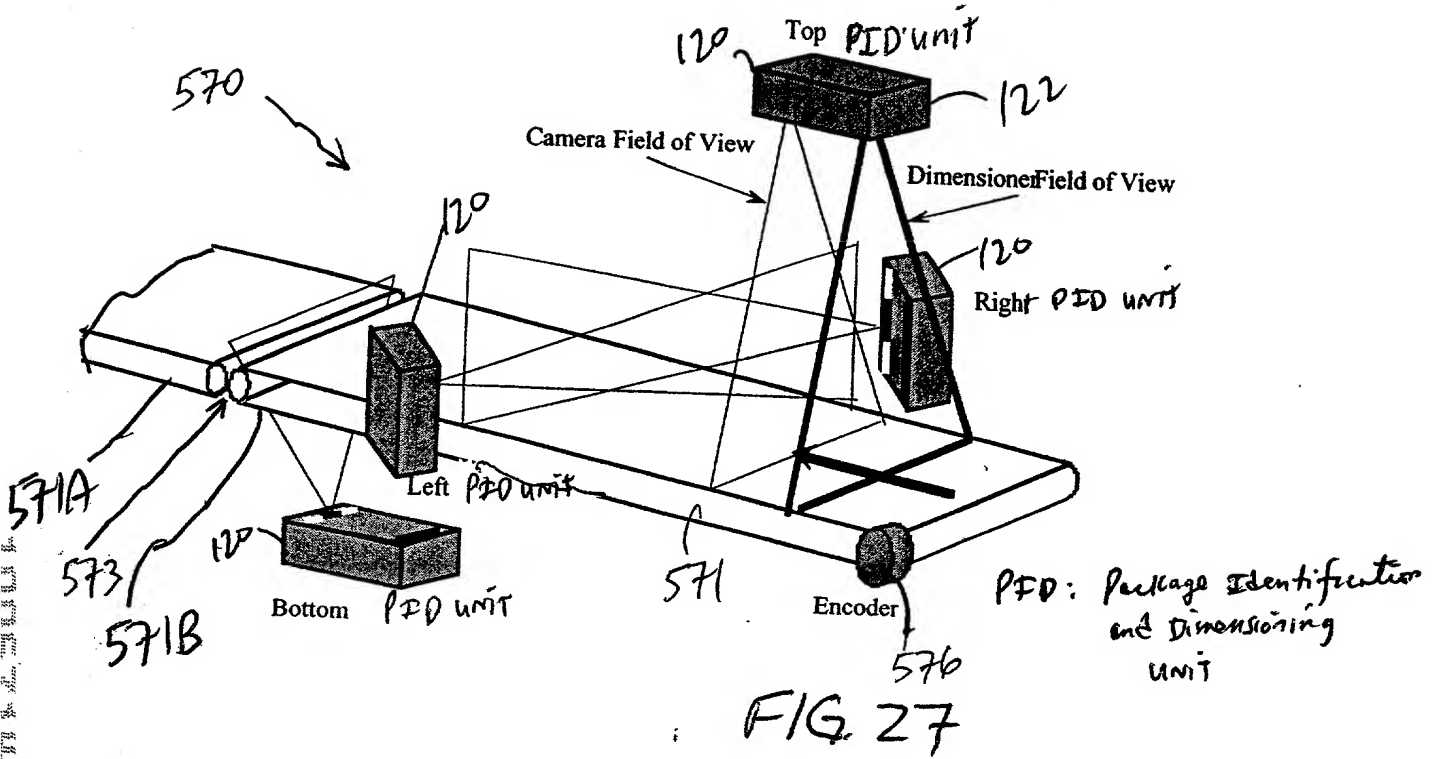


FIG. 26

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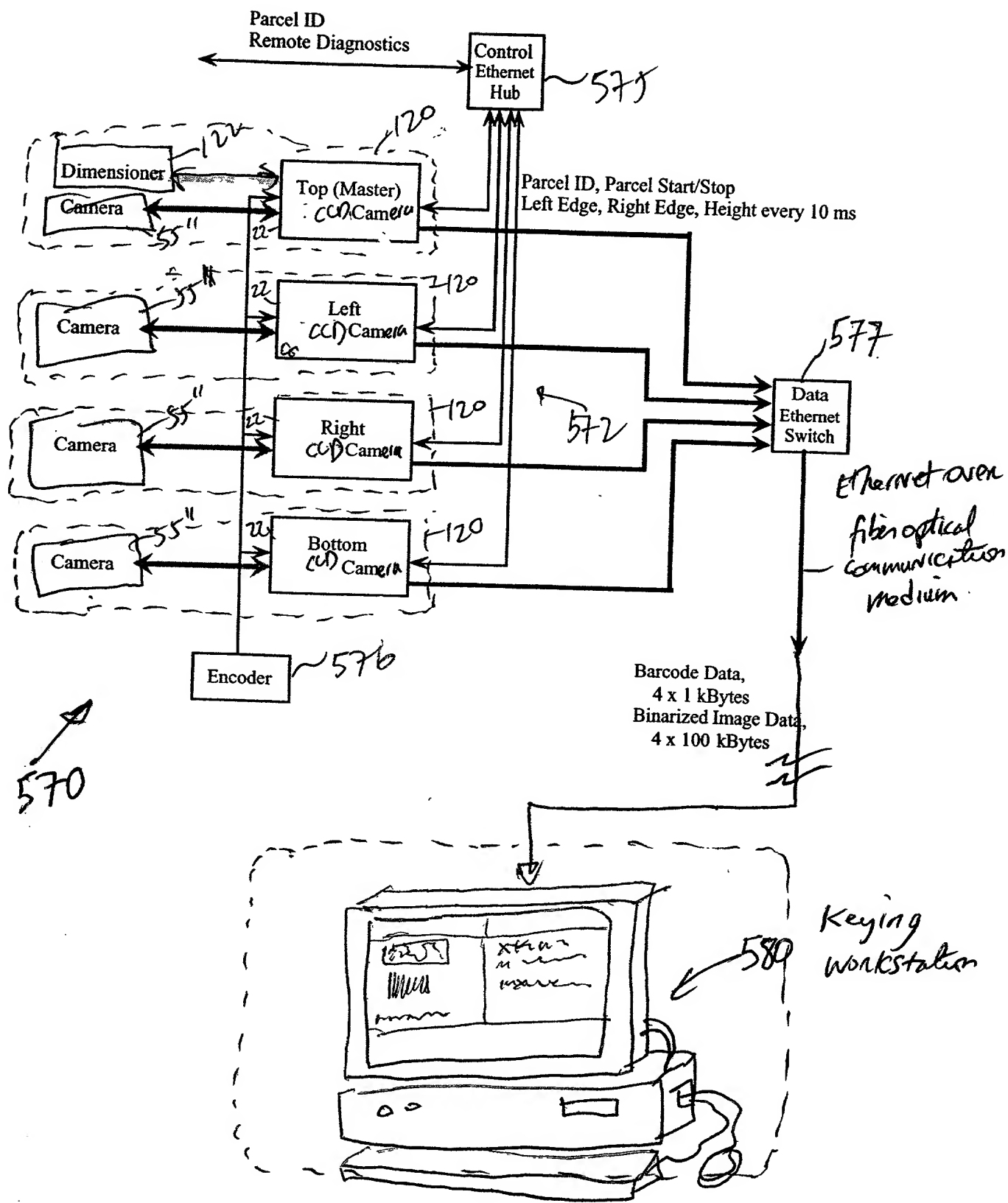


FIG. 29

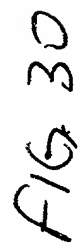


FIG 30

master unit (221) 071 120 (22)



FIG. 31



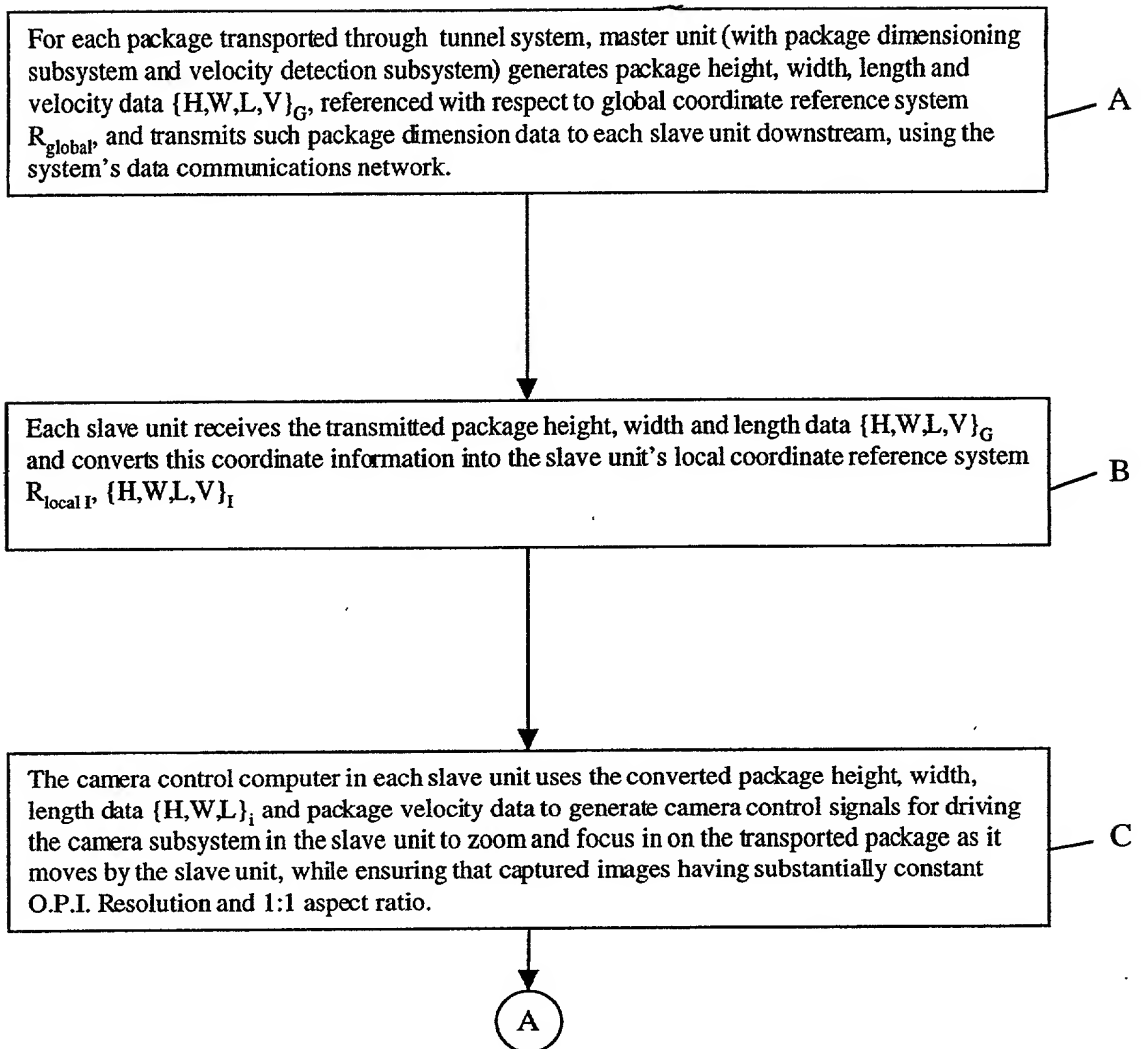


FIG. 32A

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Each slave unit captures images acquired by its intelligently controlled camera subsystem, buffers the same, and processes the images to decode bar code symbol identifiers represented in said images, and/or to perform optical character recognition (OCR) thereupon.

D



The slave unit which decodes a bar code symbol in a processed image automatically transmits a package identification data element (containing symbol character data representative of the decoded bar code symbol) to the master unit (or other designated system control unit employing data element management functionalities) for package data element processing.

E



Master unit time-stamps received package identification data element, places said data element in a data queue, and processes package identification data elements and time-stamped package dimension data elements in said queue to link each package identification data element with one said corresponding package dimension data element.

F

FIG. 32B

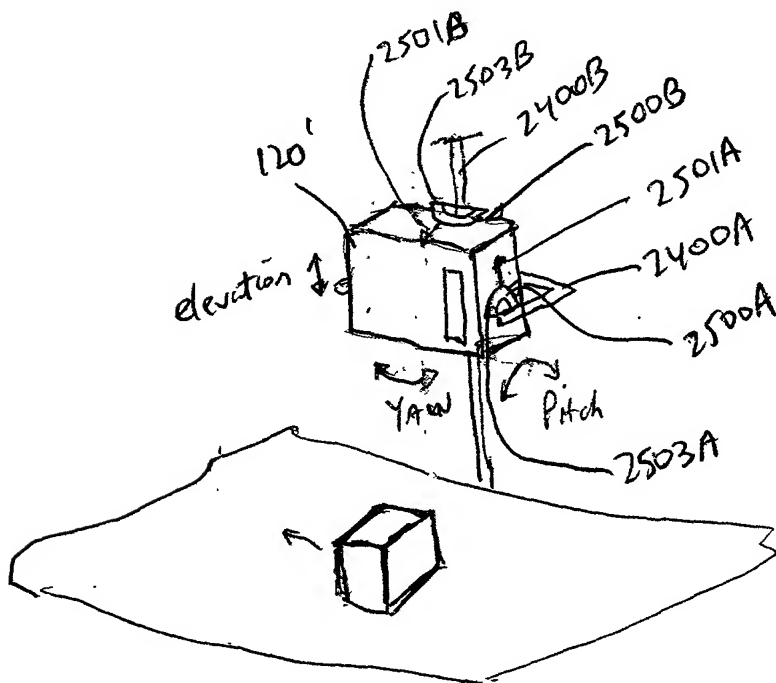


FIG. 31A

2000-04-29

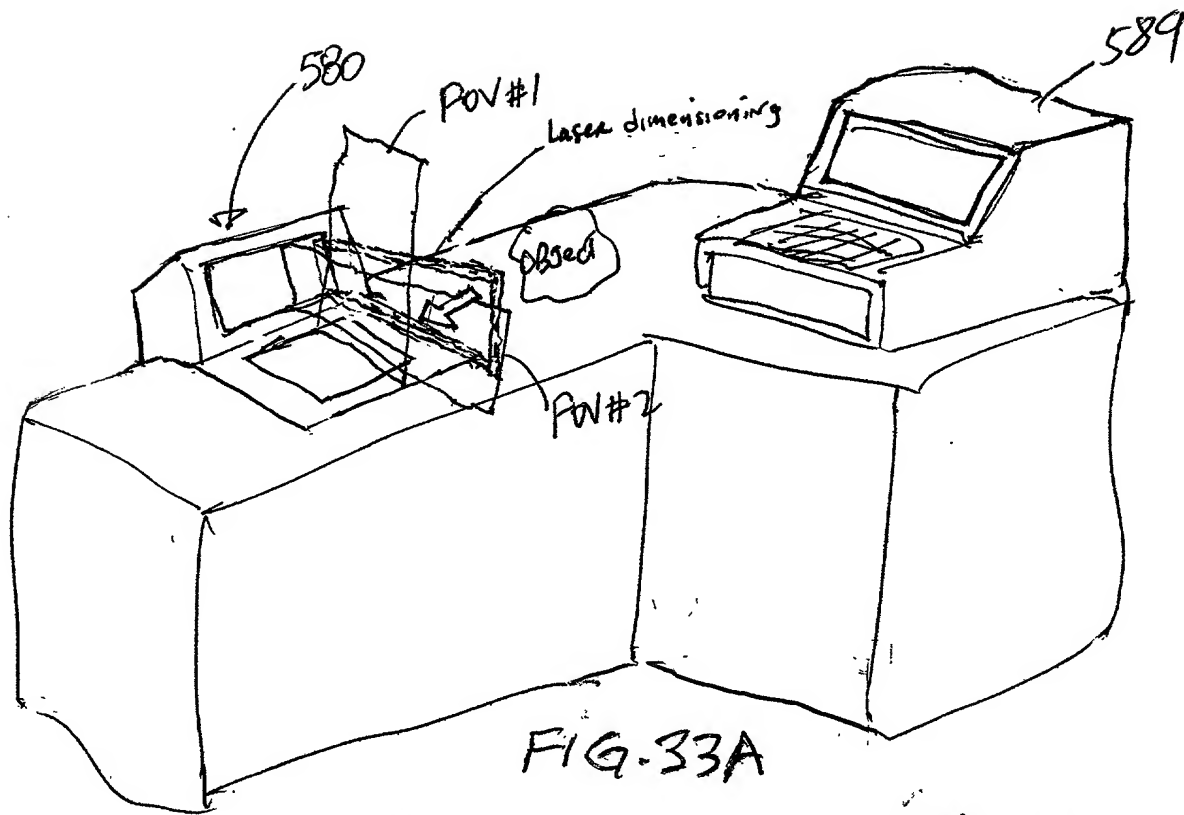


FIG. 33A

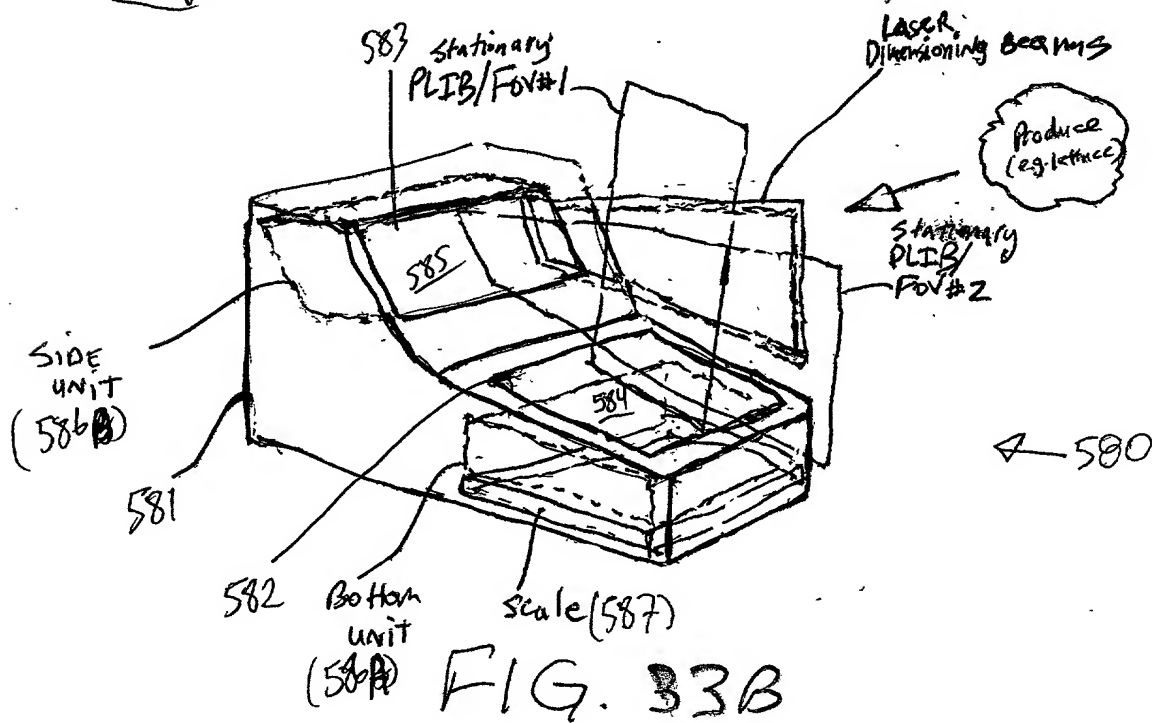


FIG. 33B

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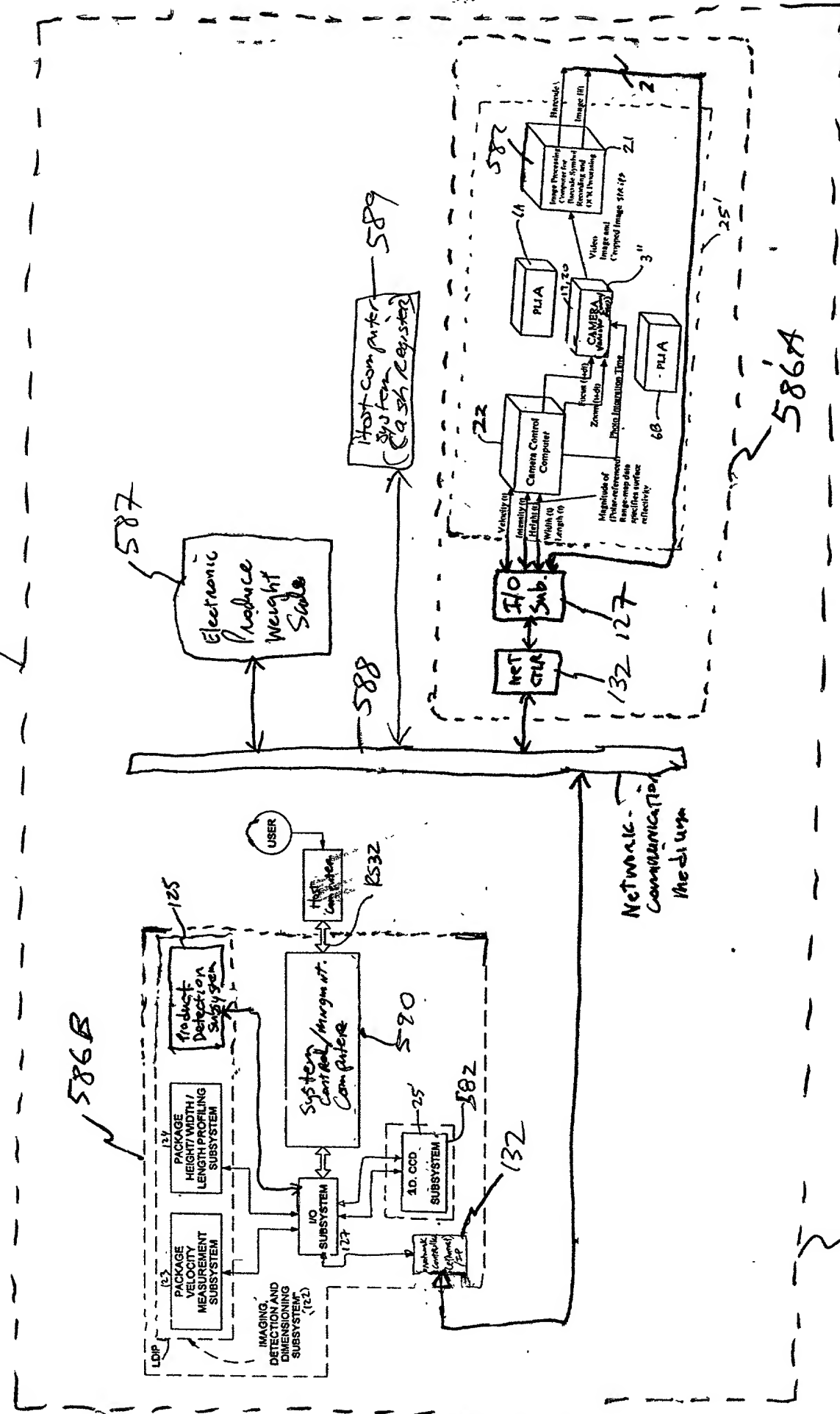


FIG. 33C

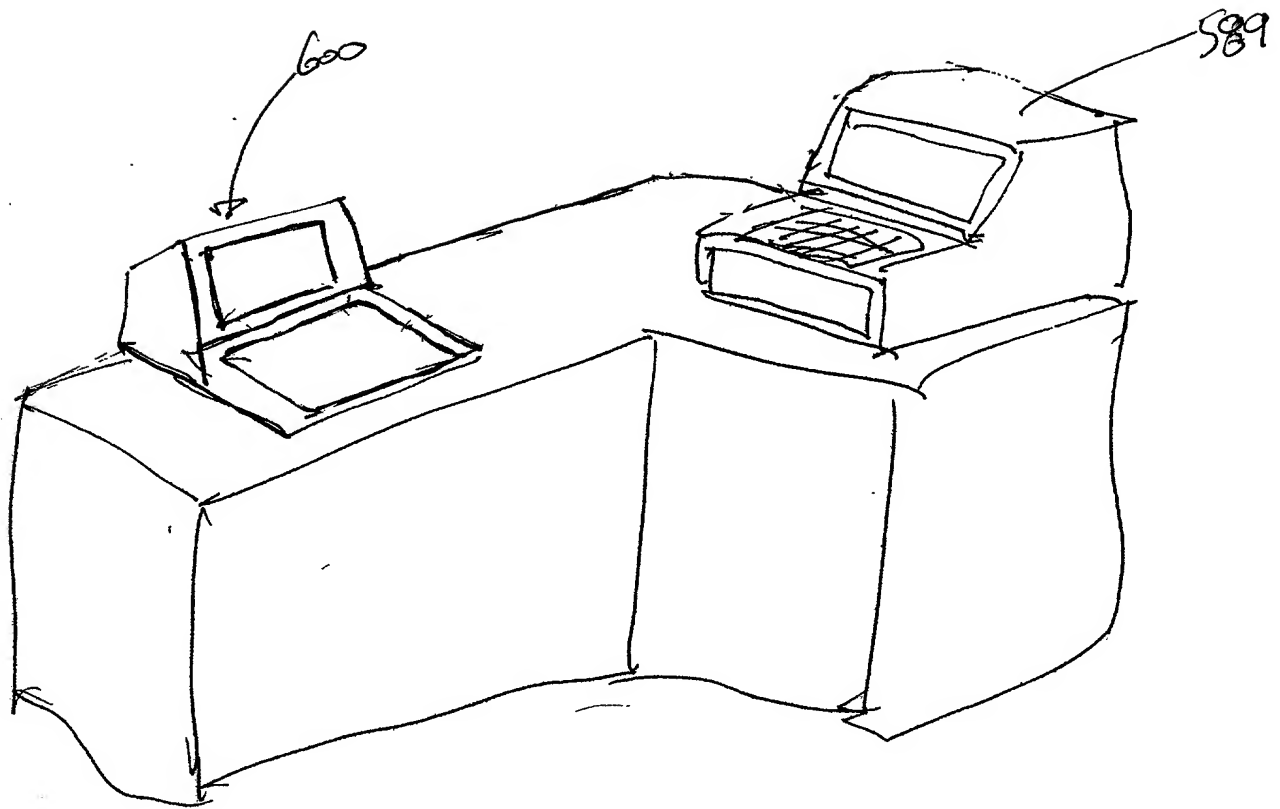


FIG. 34A

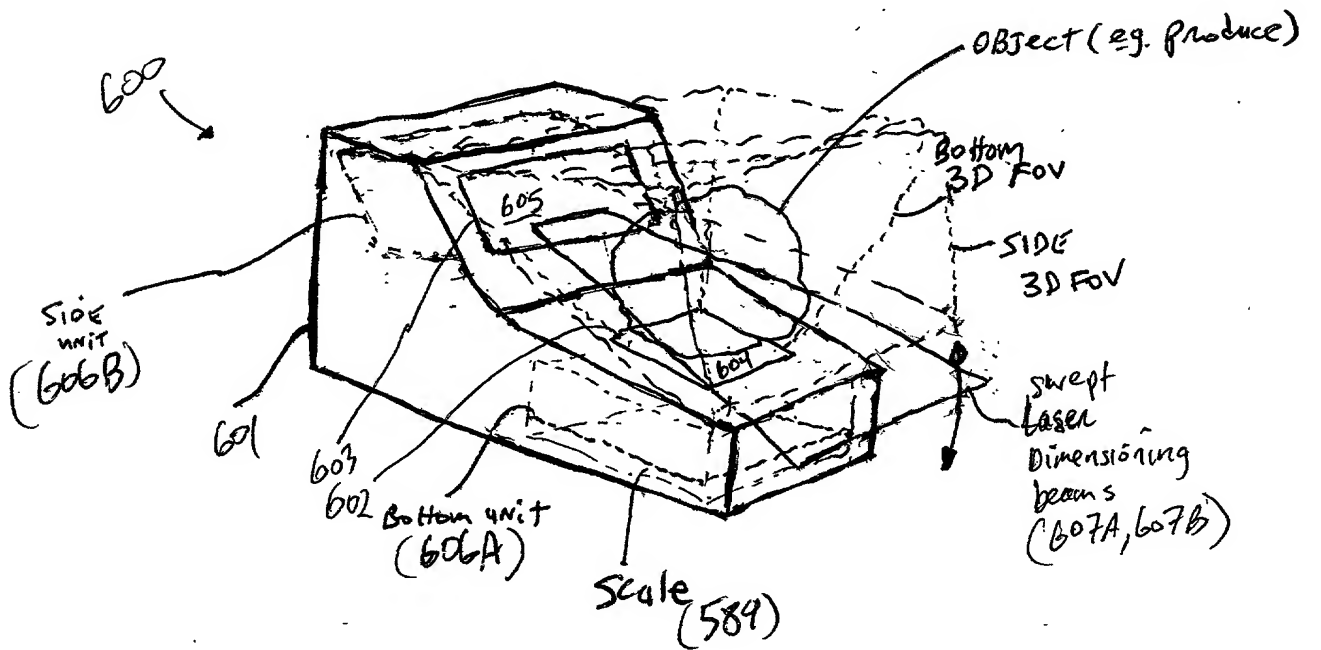
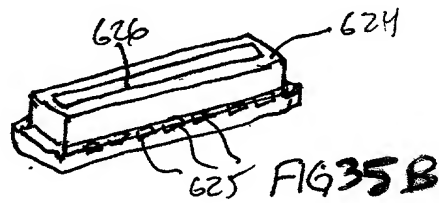
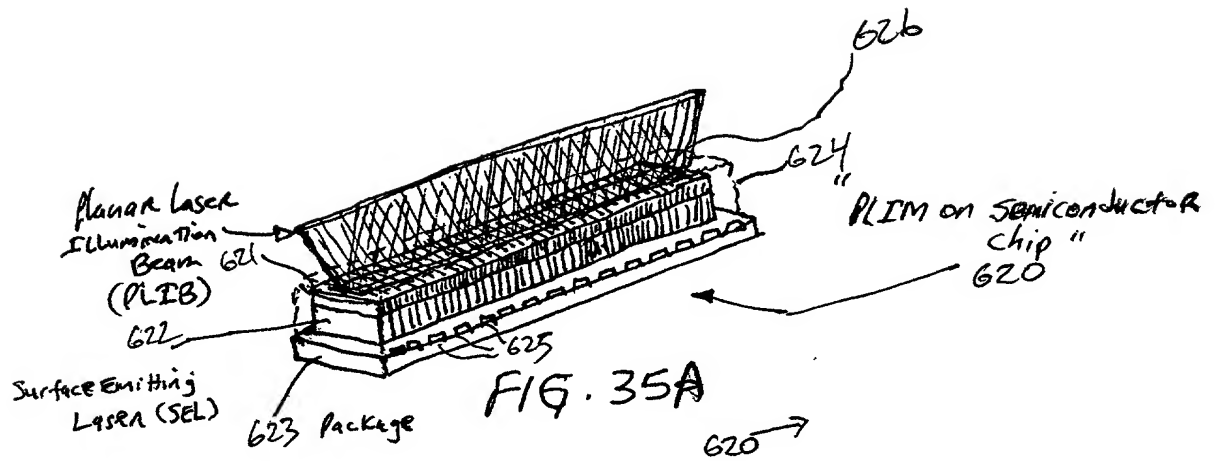
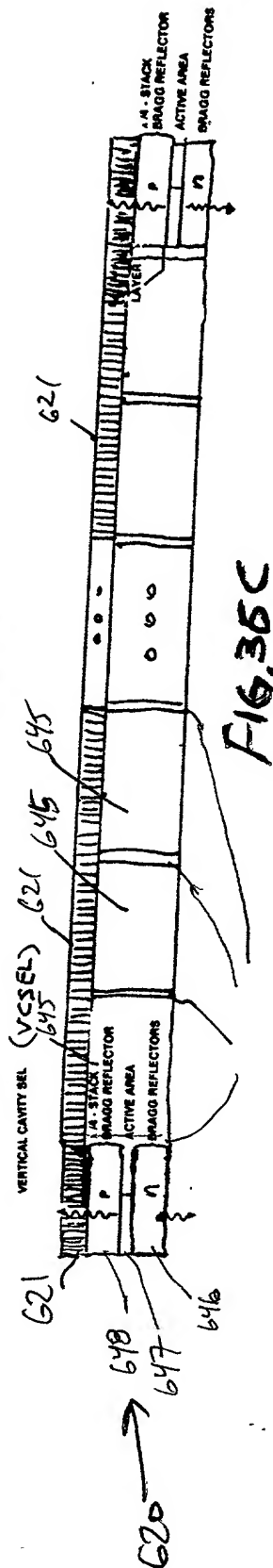


FIG. 34B



FIG. 34C







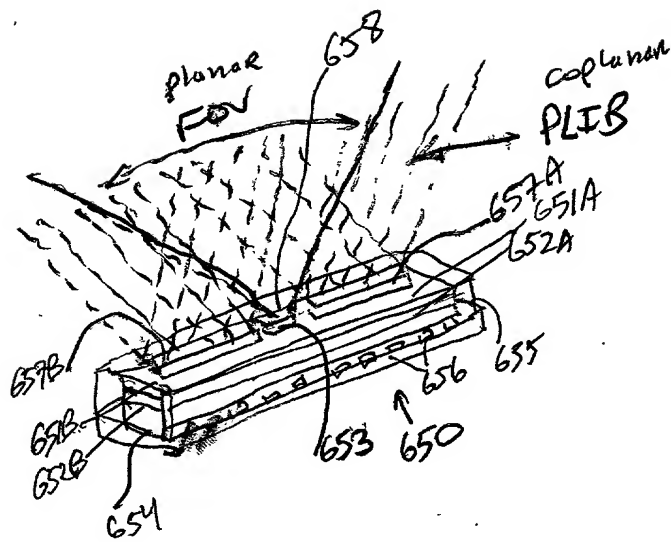


FIG. 37

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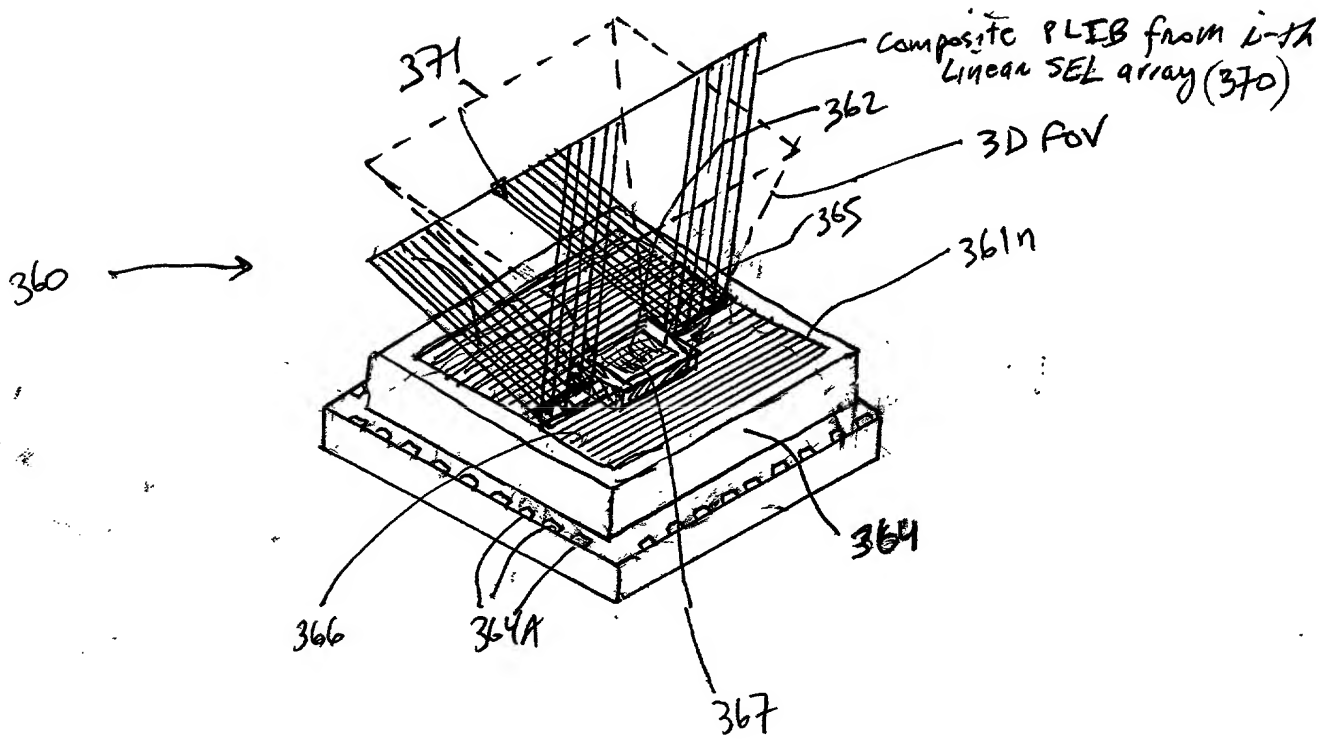


FIG. 38A

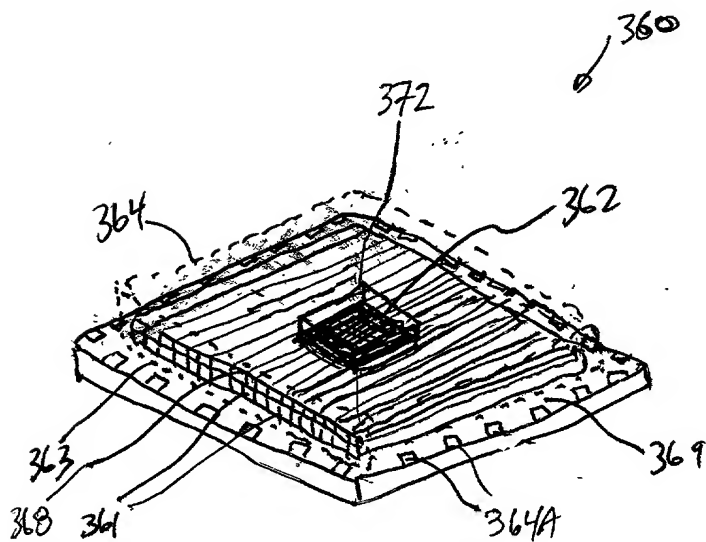


FIG. 38B

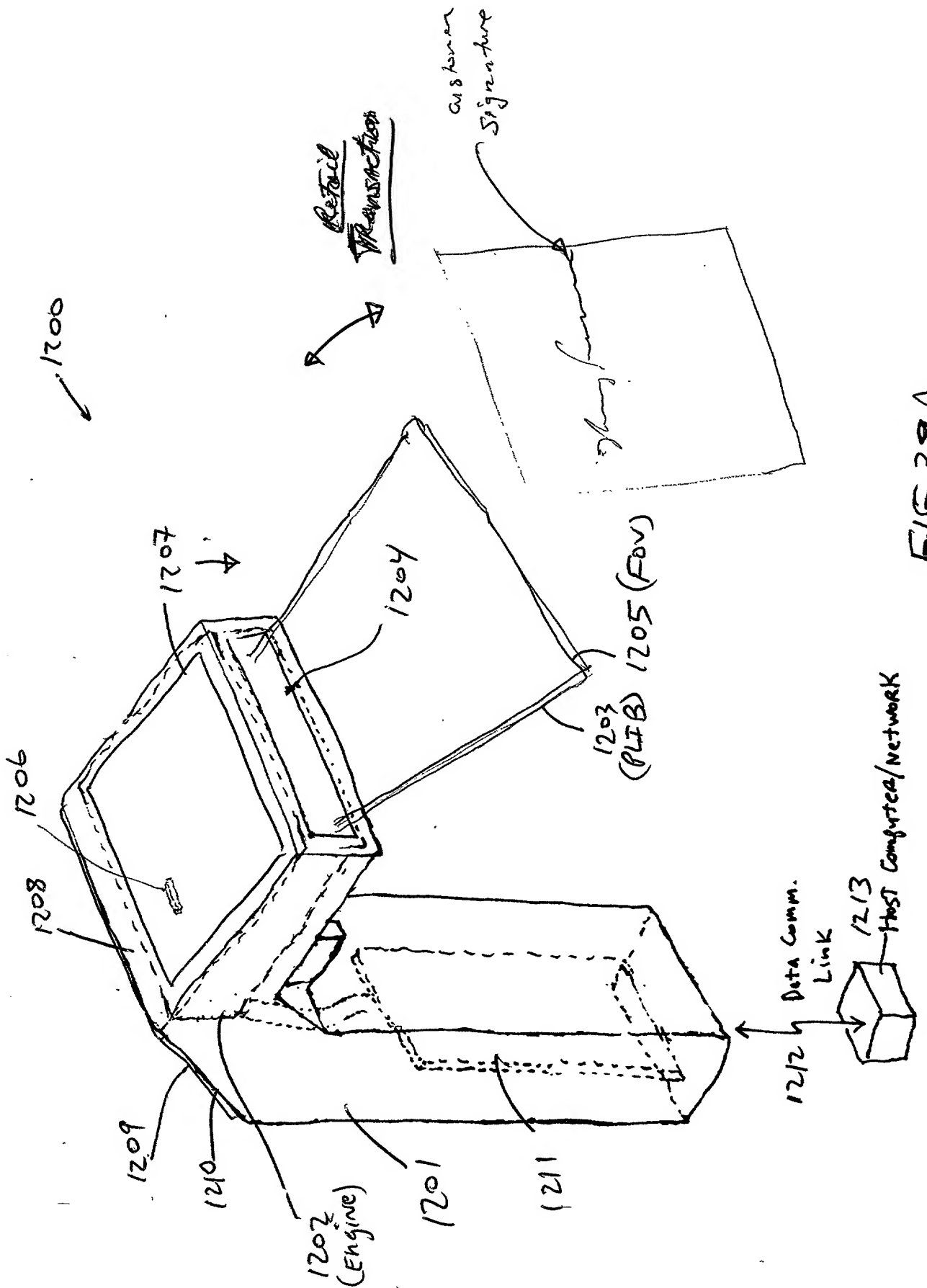


FIG. 39A

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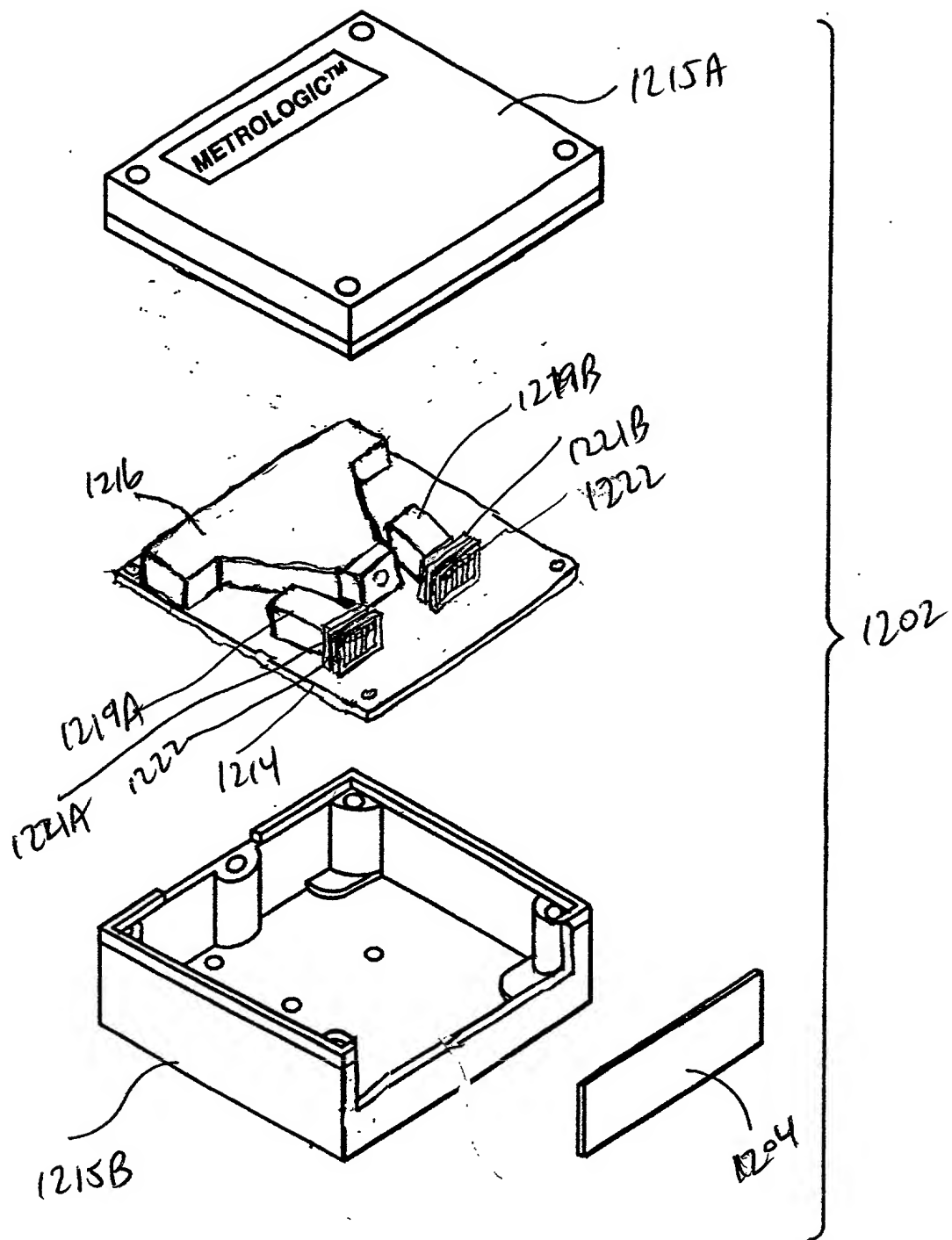
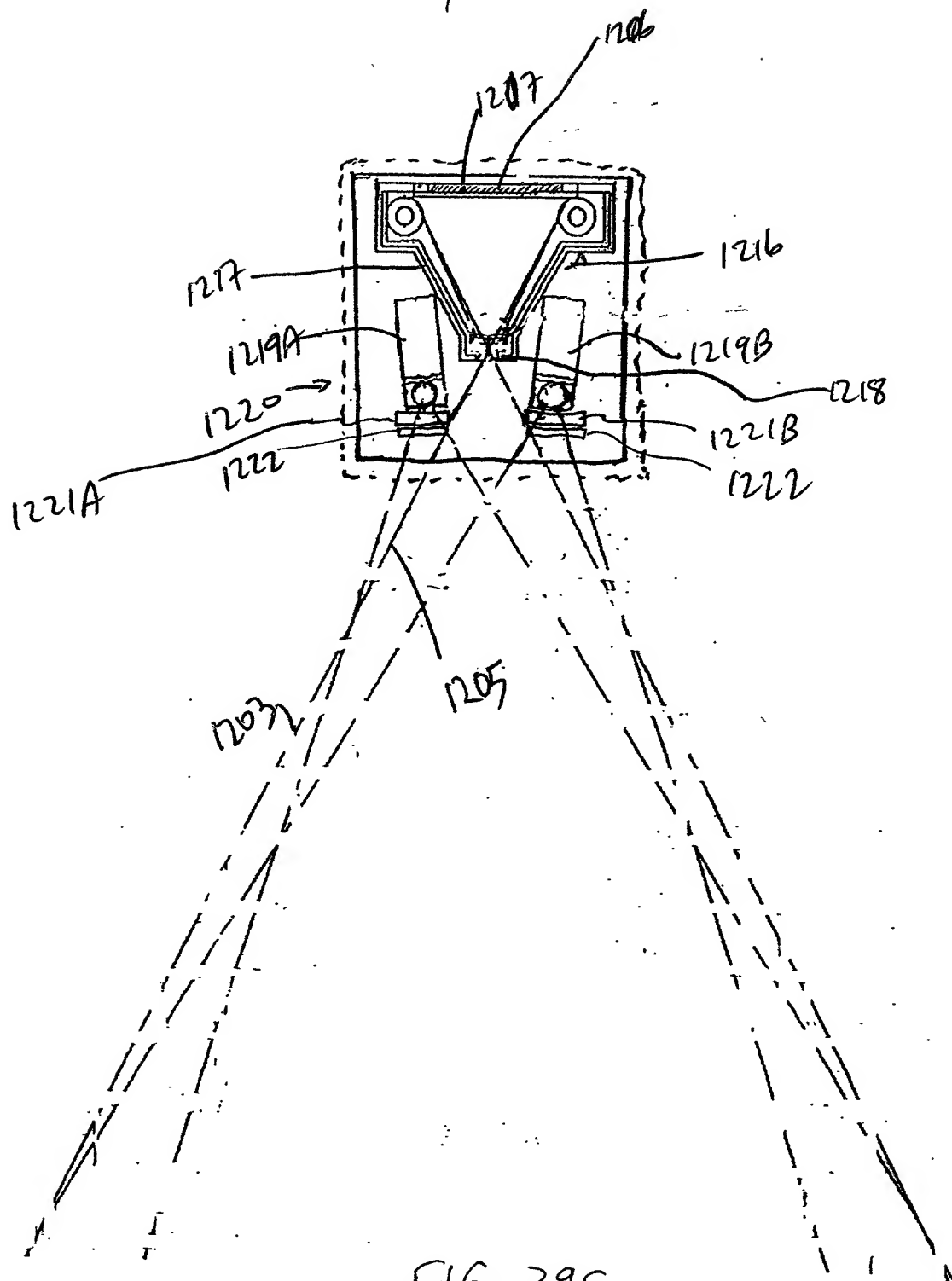


FIG. 39B

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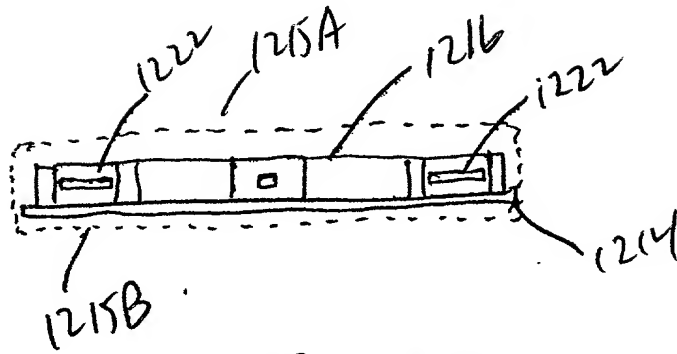


FIG. 39D

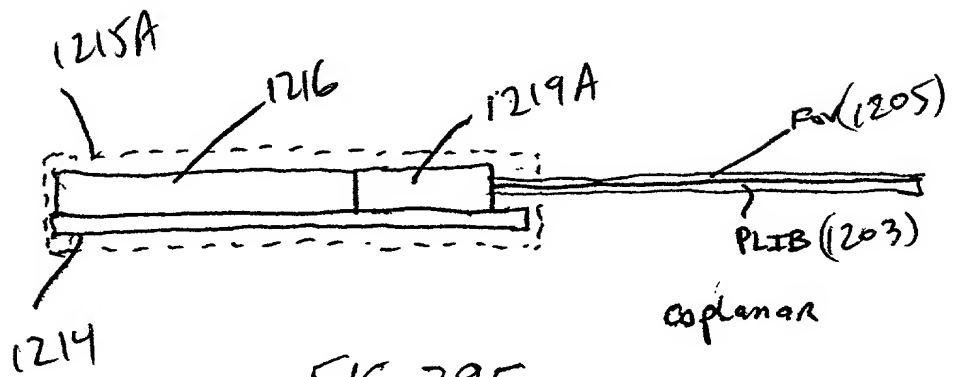


FIG. 39E

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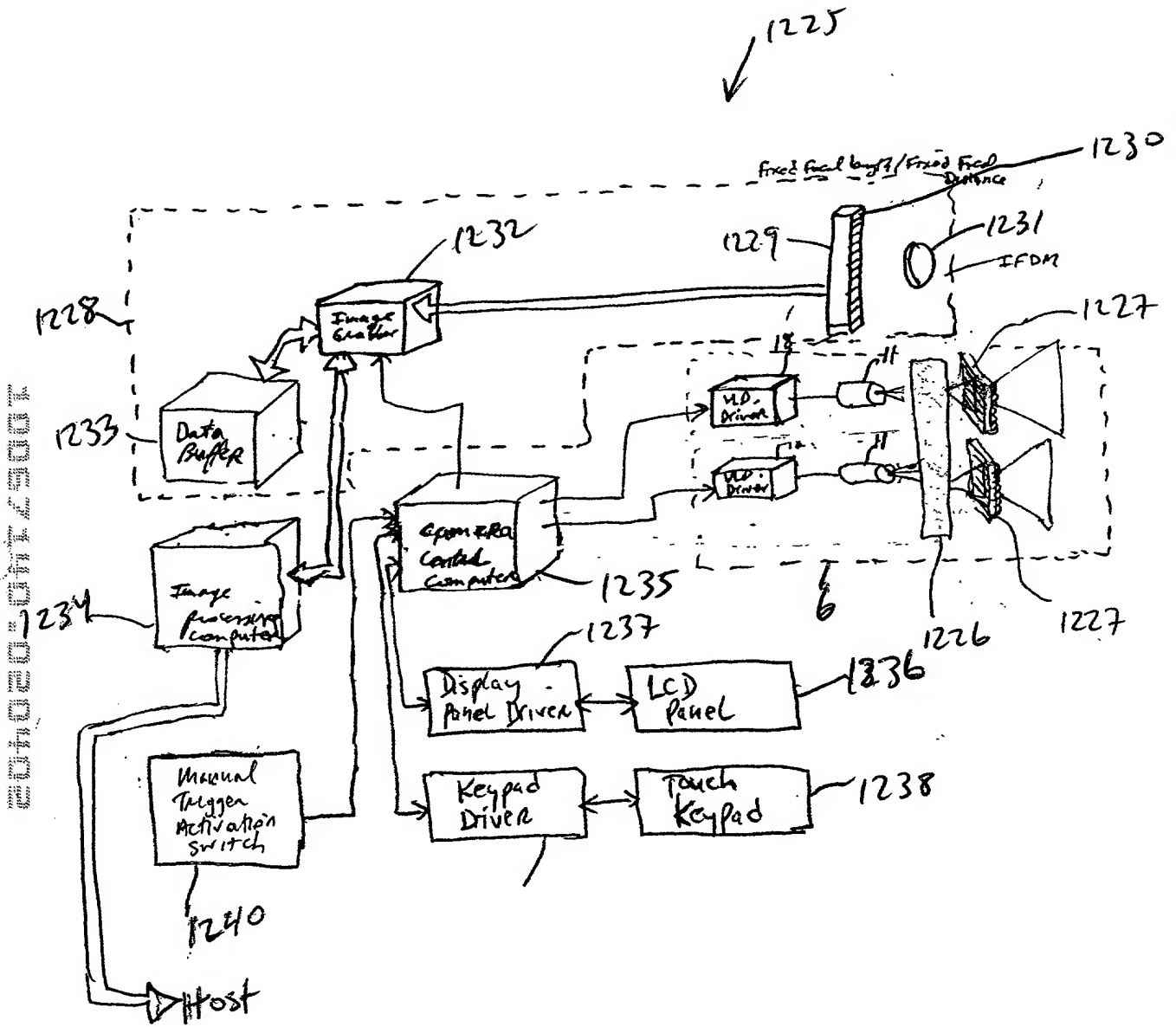
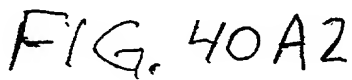


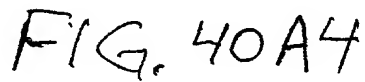
FIG. 40A1

[illegible]

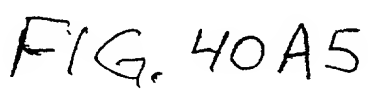




21



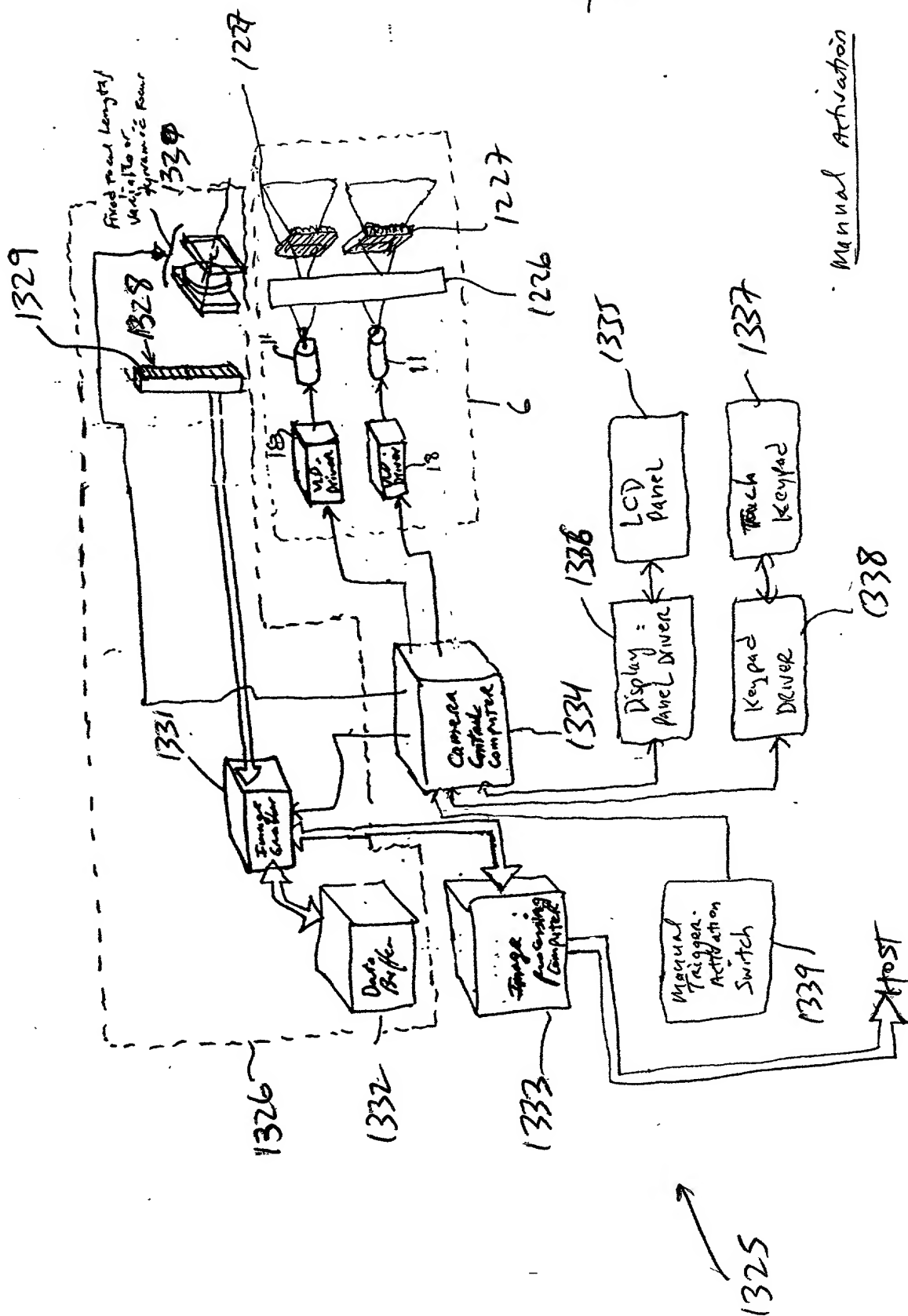
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Manual Activation

FIG. 40B1



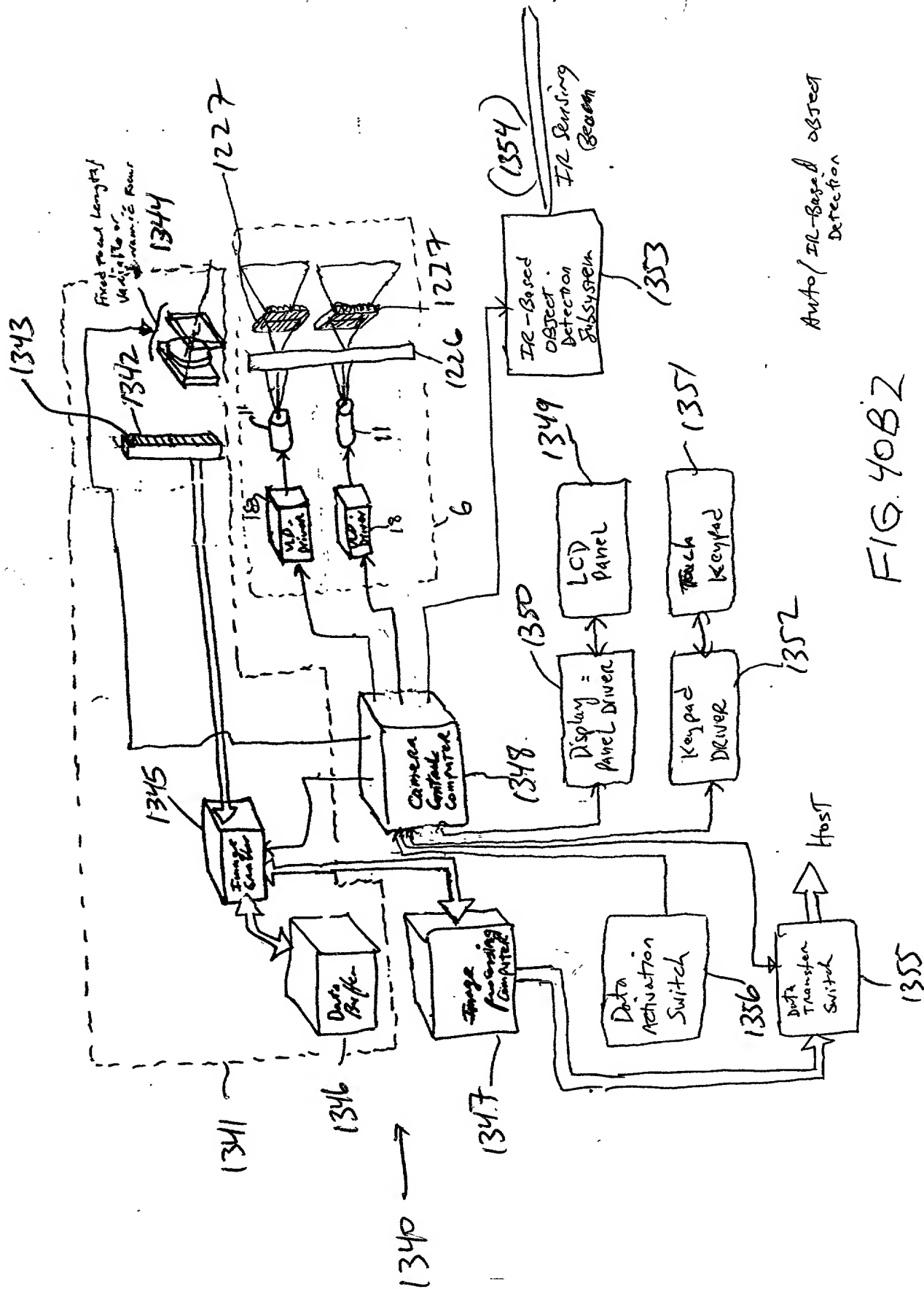
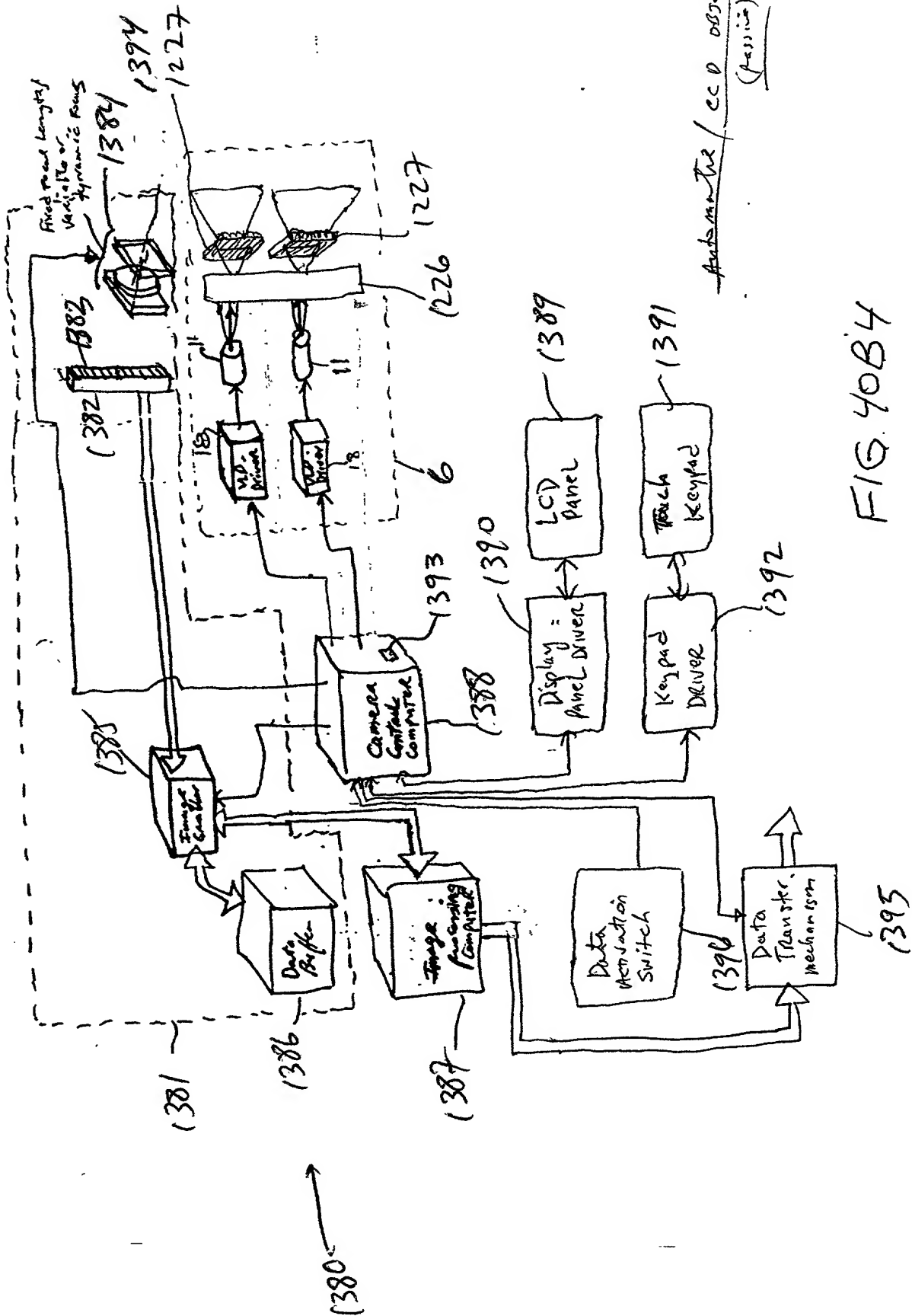




FIG. 40B3

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Automotive / CCD Object Detect.  
(Passive)

FIG. 40B4

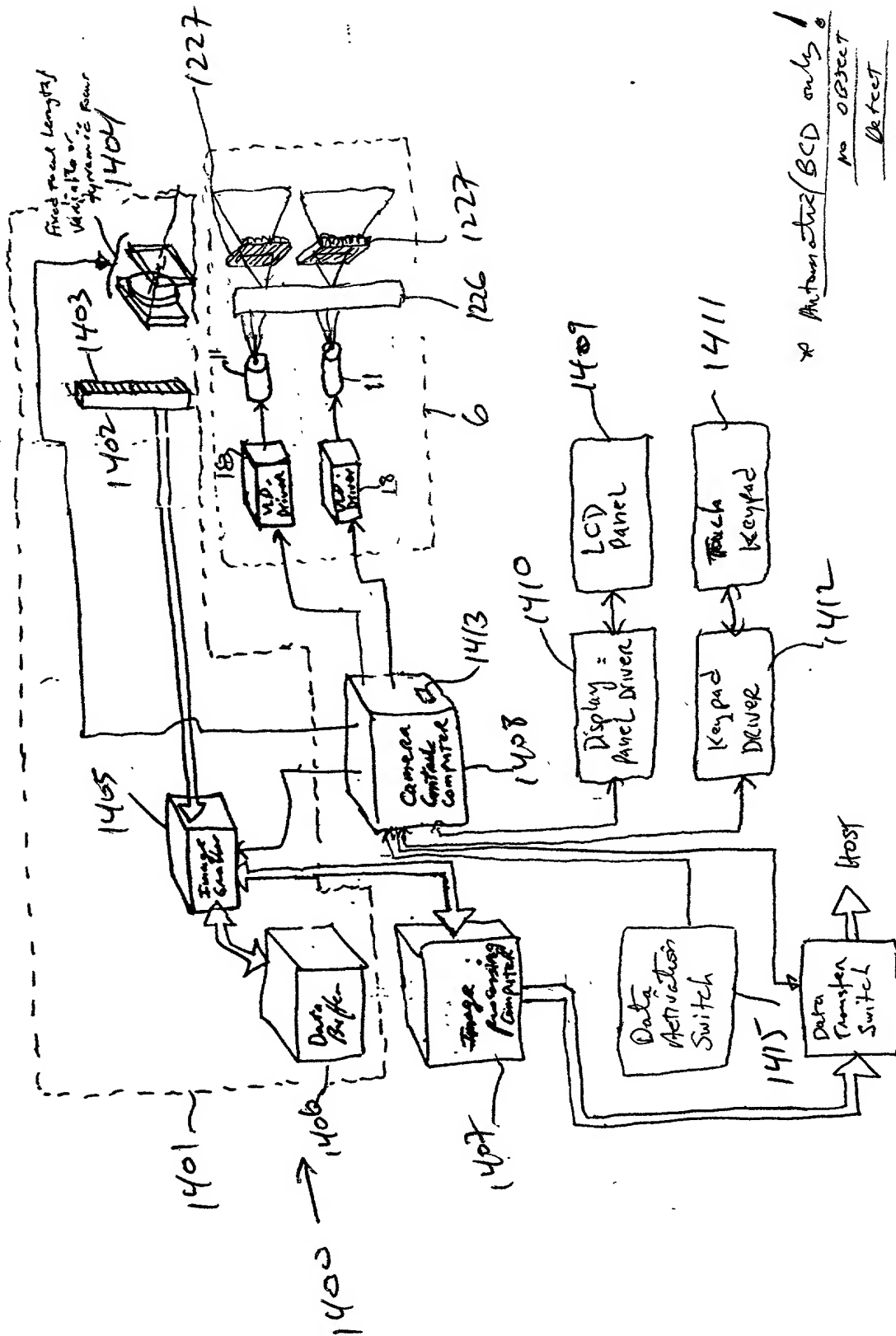


FIG. 40B5

h(42)



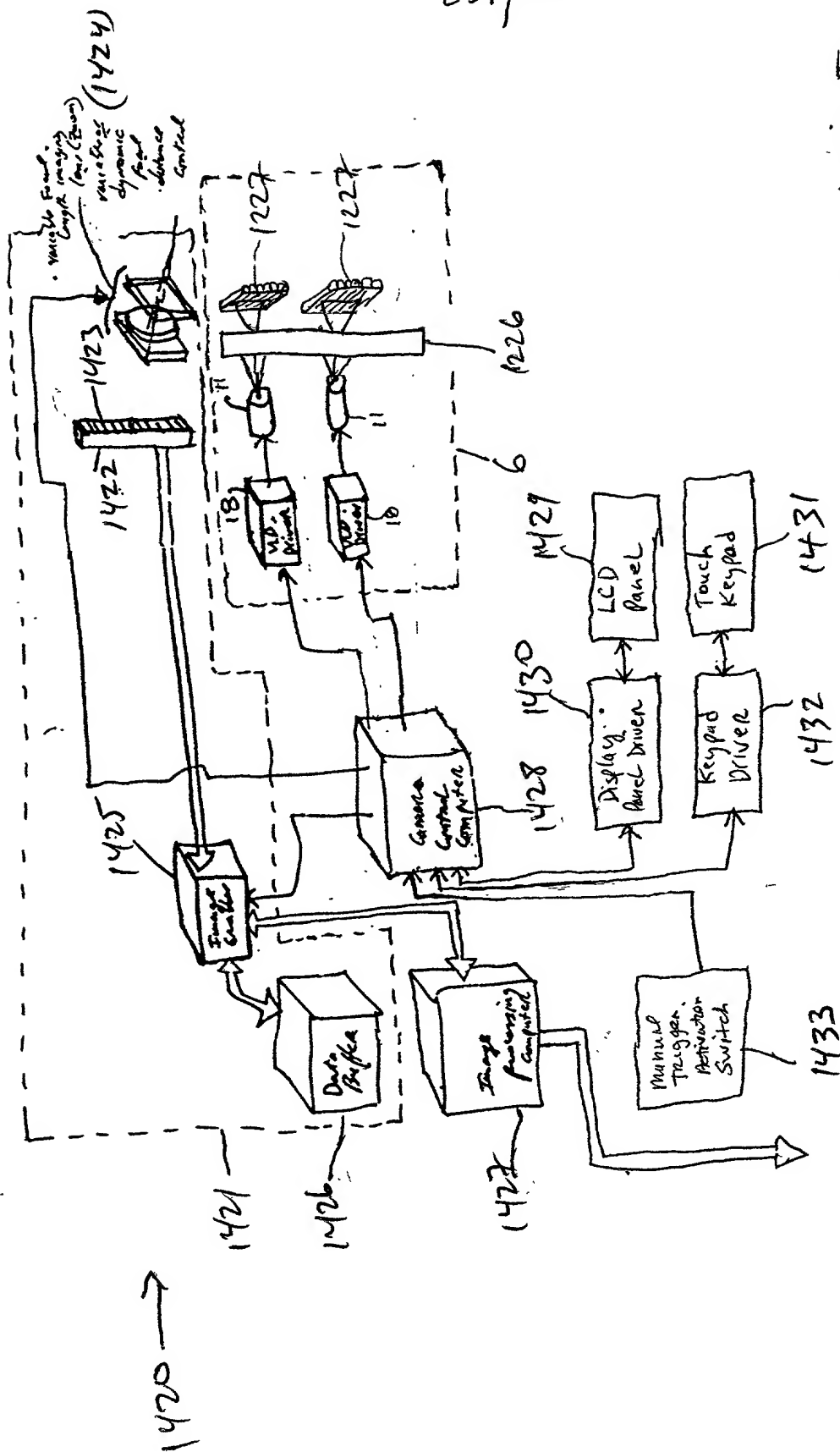


FIG. 40C1

Manual Activation

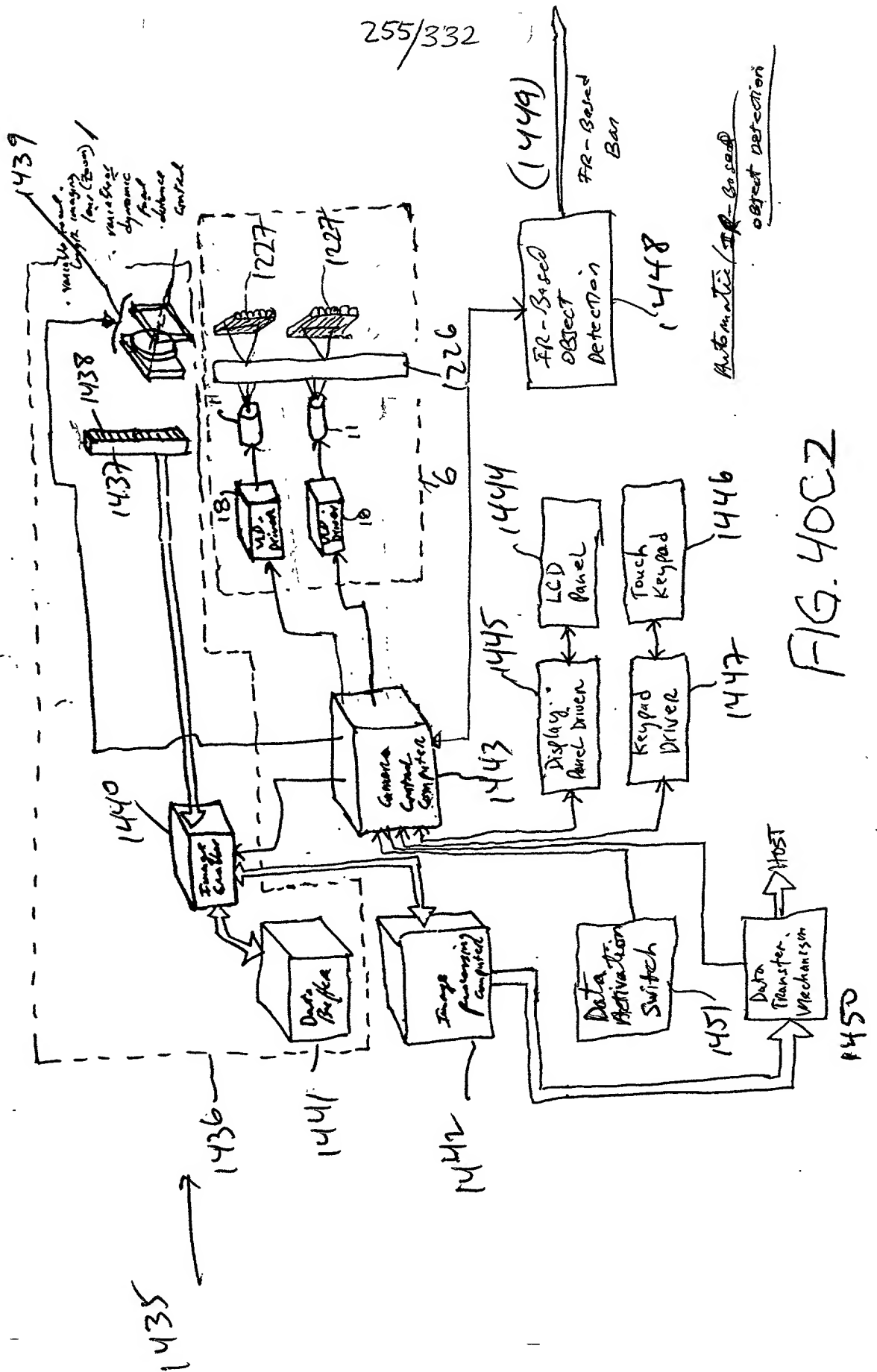


FIG. 40C2

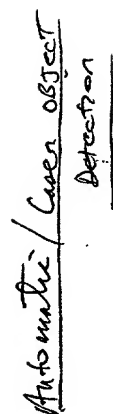


FIG. 40C3

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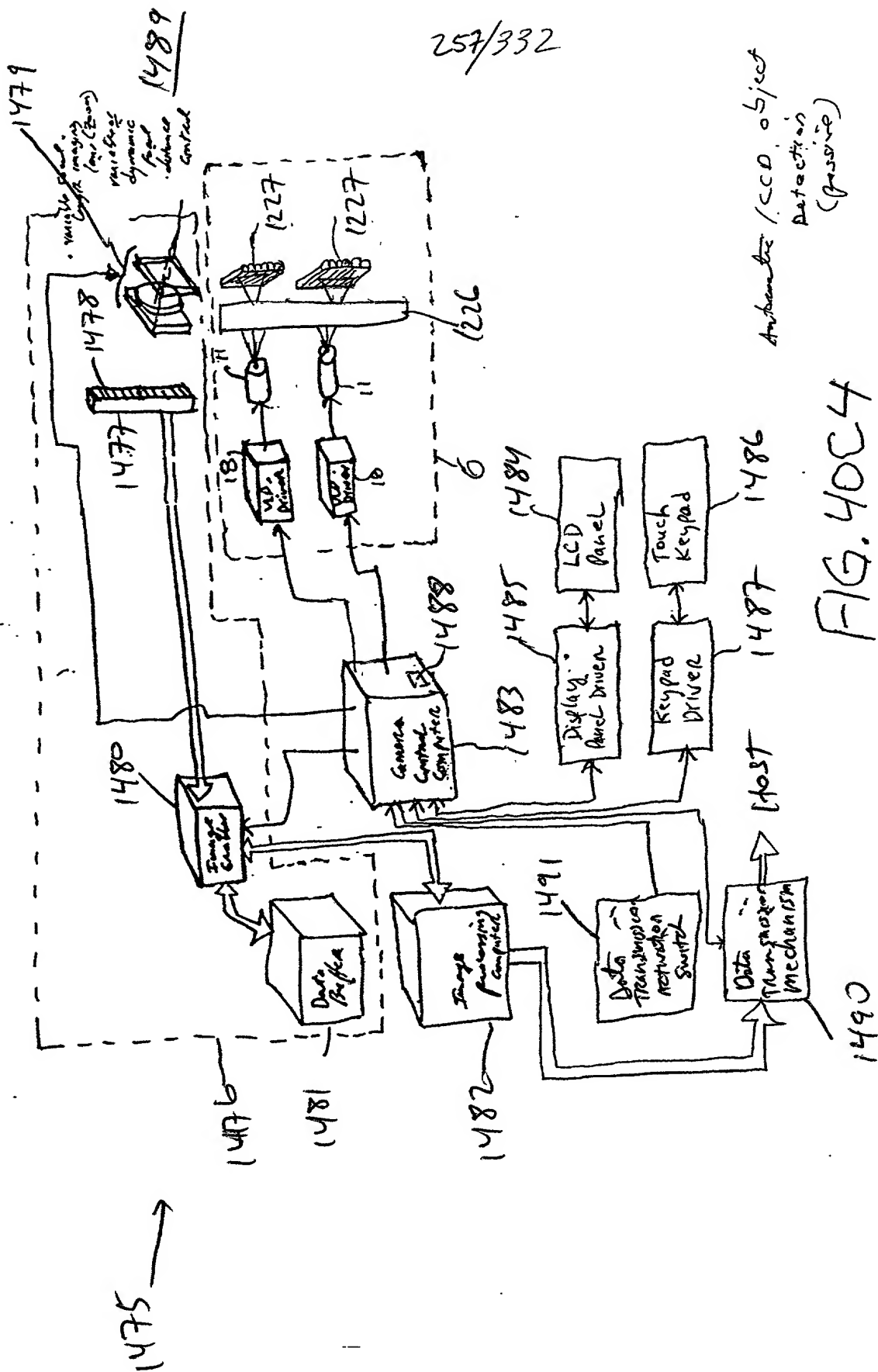


FIG. 40C4

Active / CCD object  
detection  
(passive)

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Automatic/PC only  
- no object detect

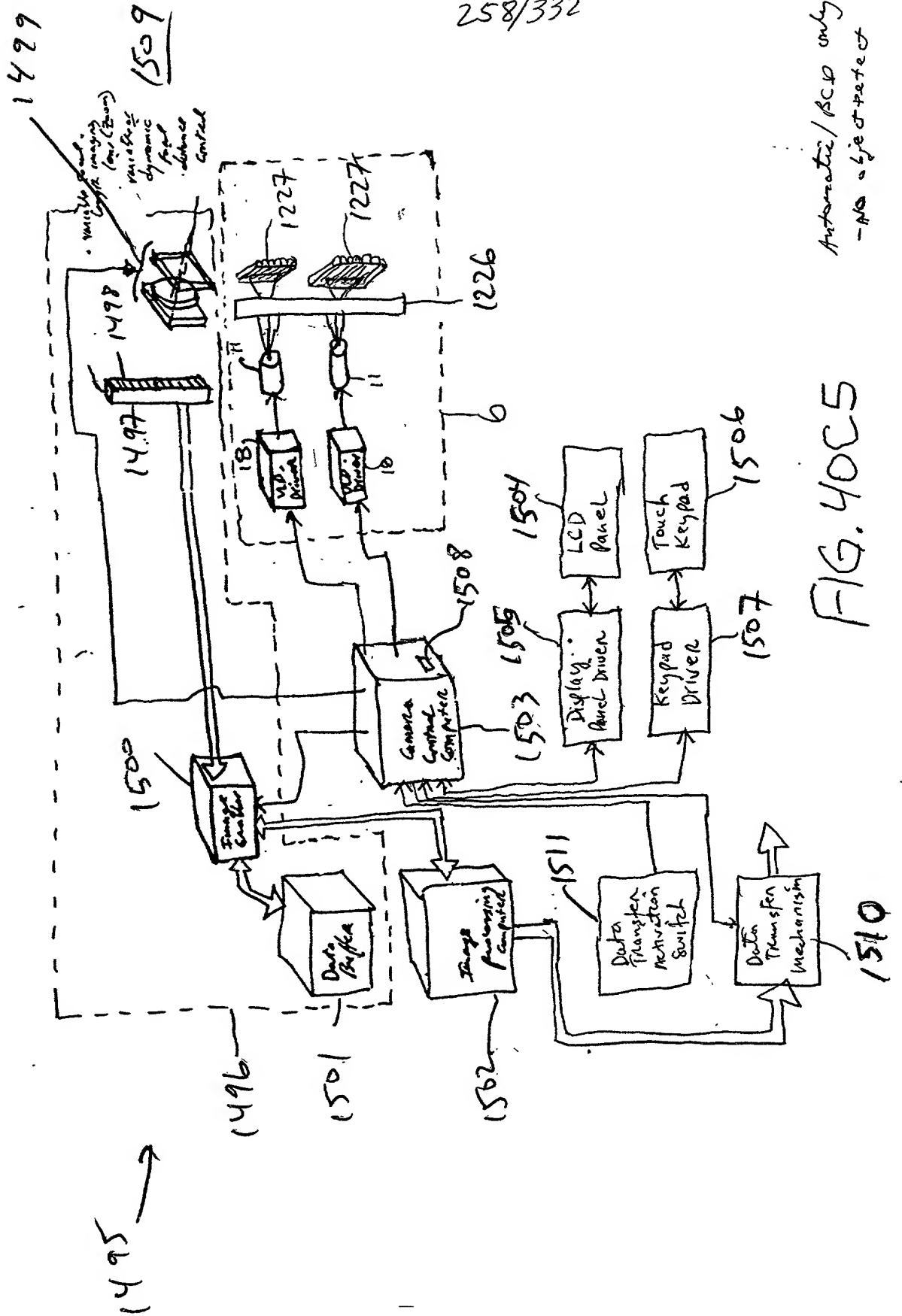


FIG. 40C5

1-D  
display

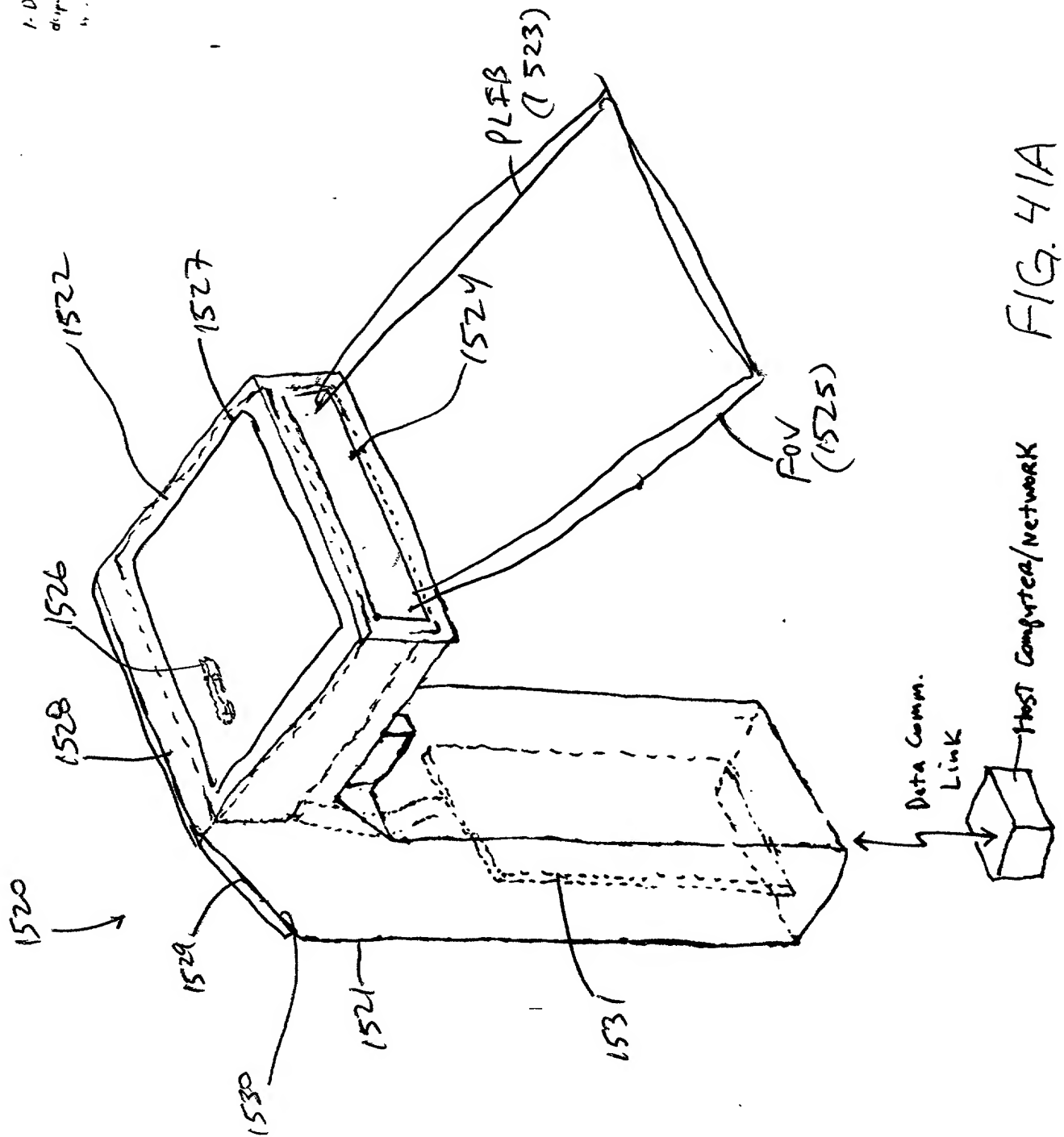


FIG. 41A

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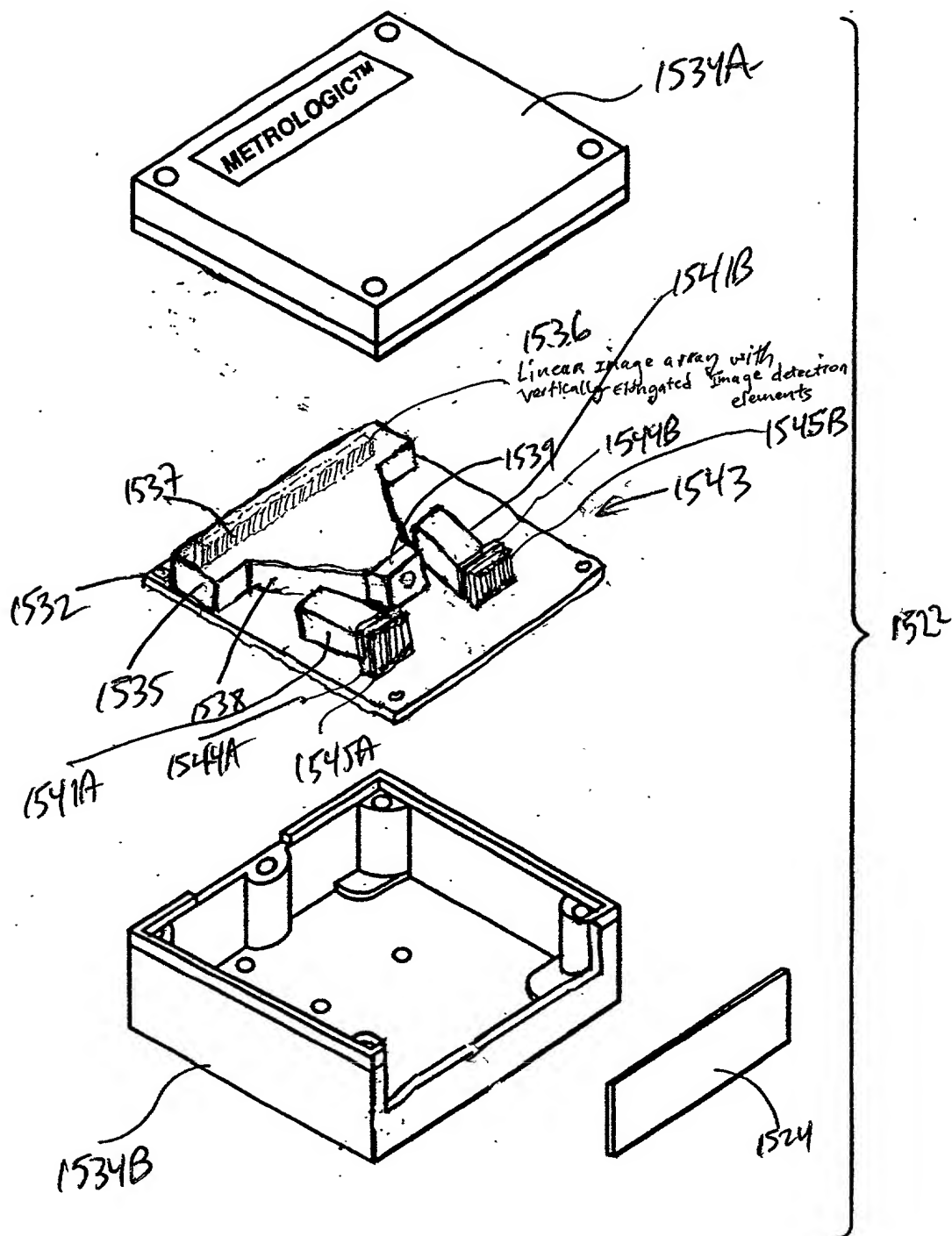


FIG. 41B

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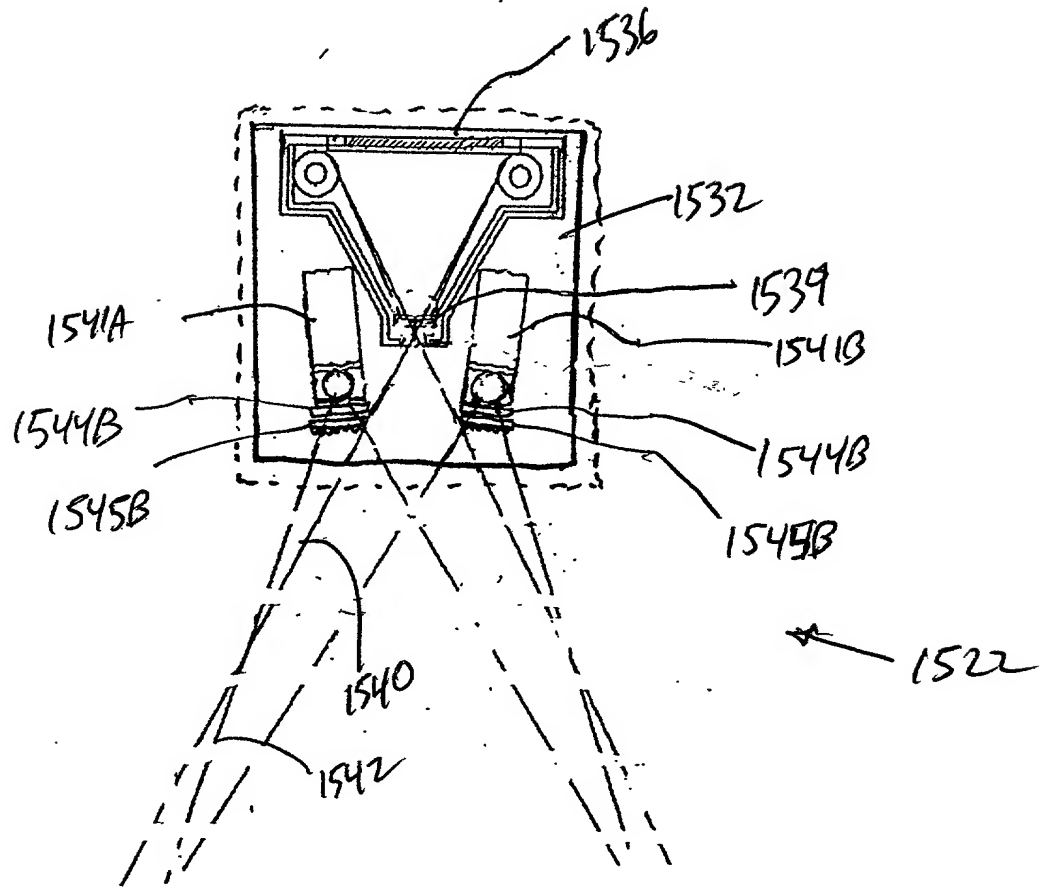


FIG. 41C

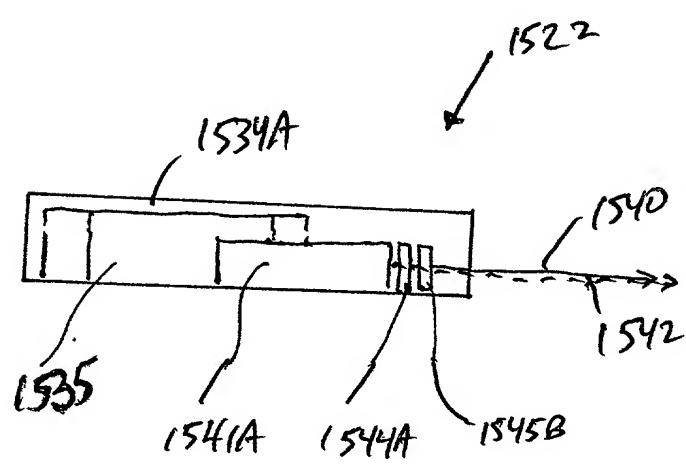


FIG. 41D



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1-D  
display  
...

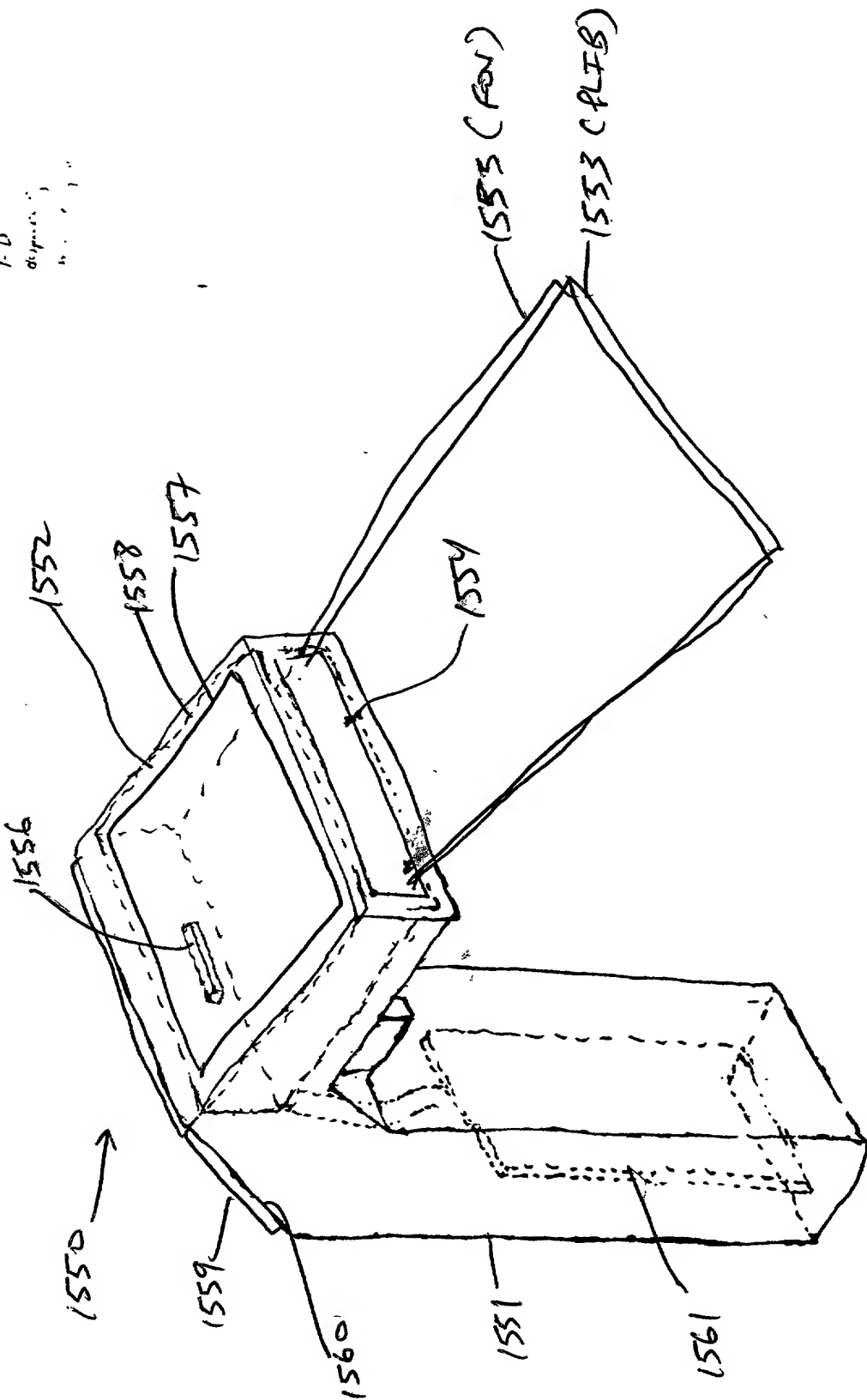


FIG. 42A

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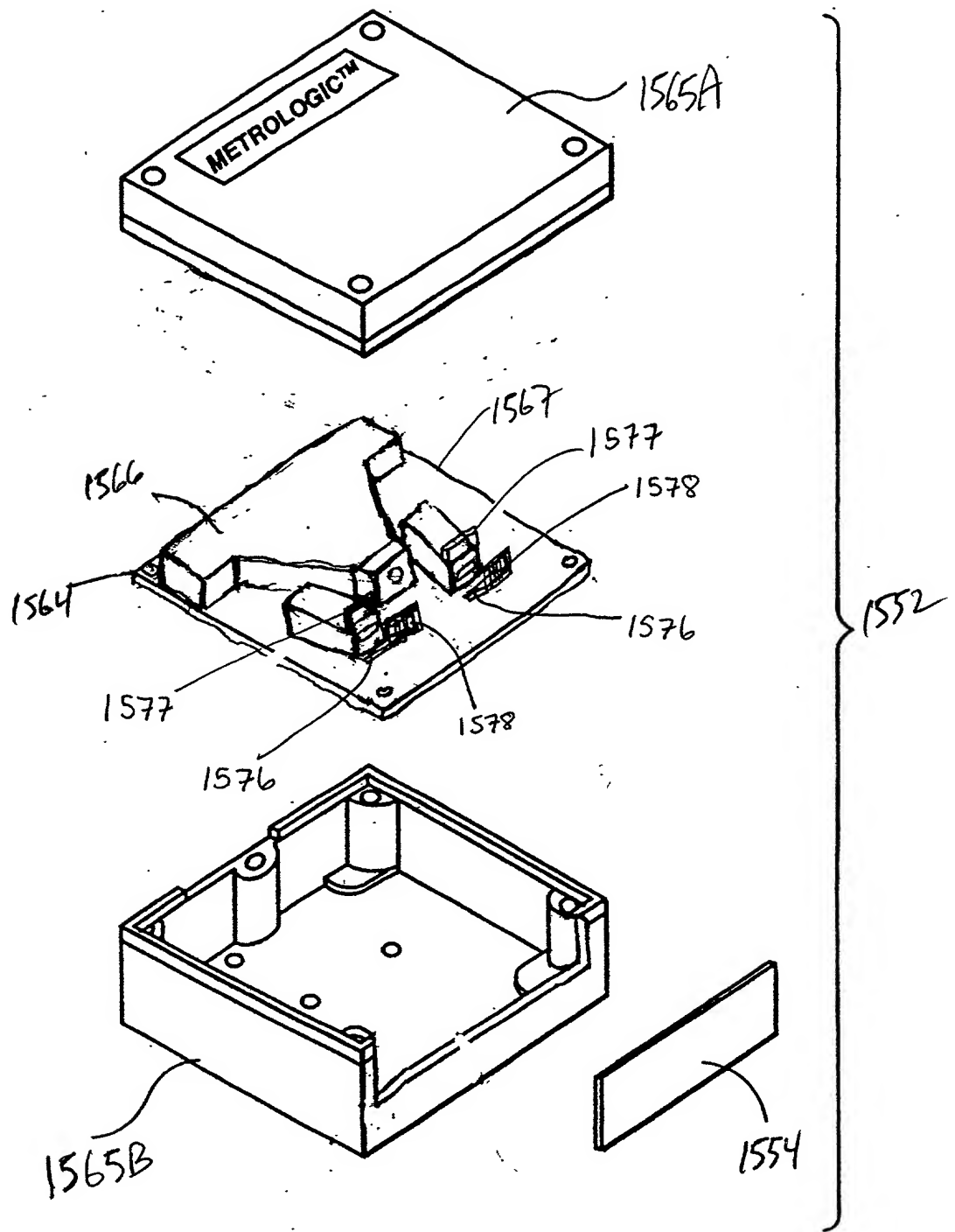


FIG. 42B

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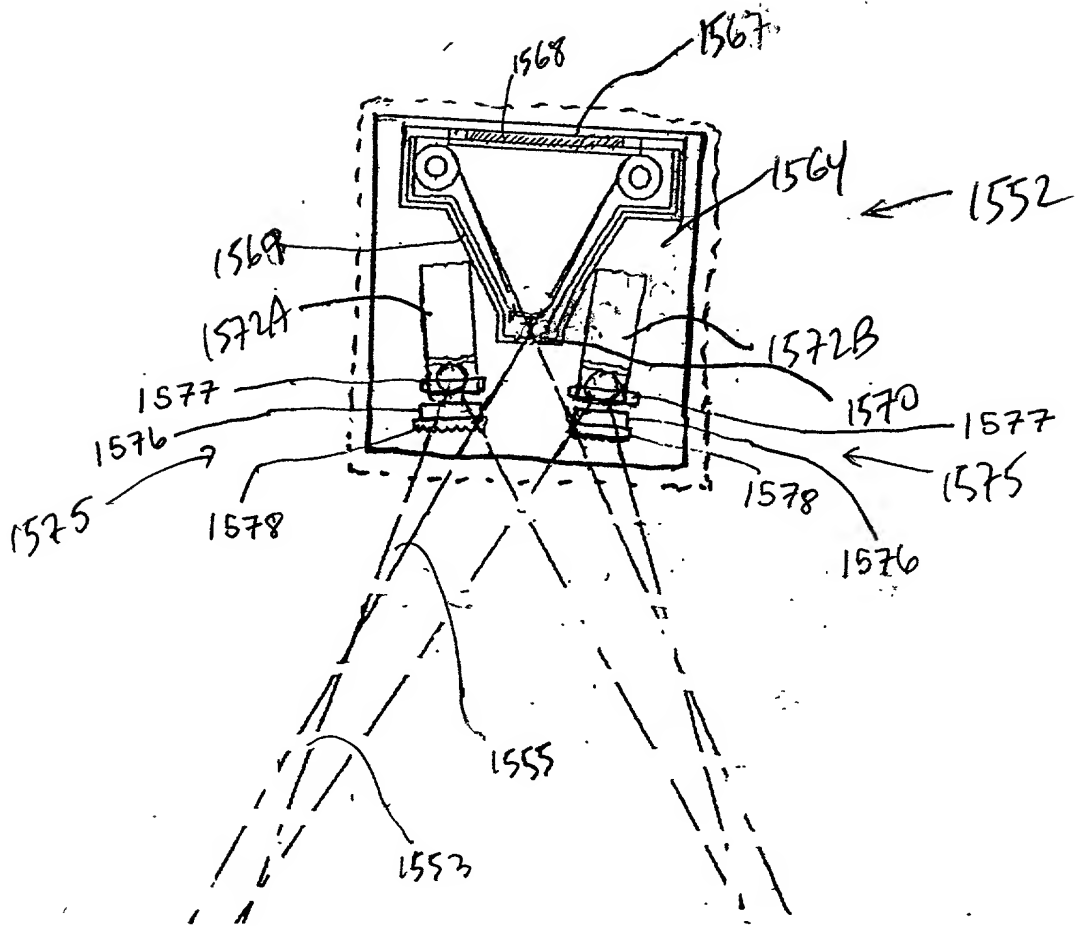


FIG. 42C

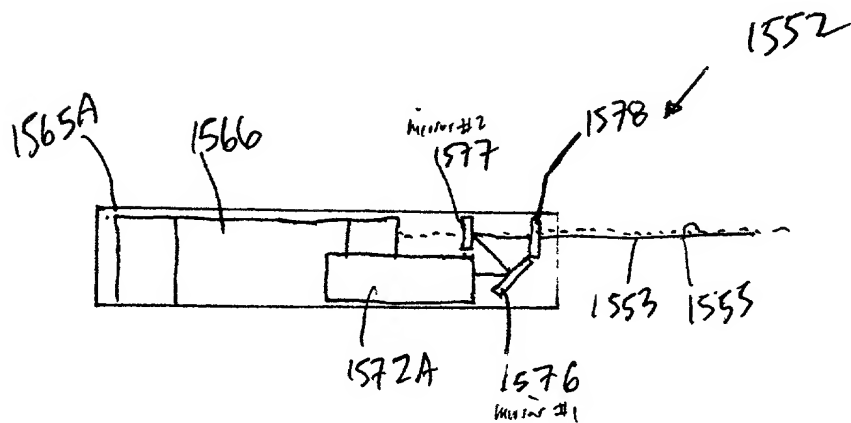


FIG. 42D

FIG. 43A

1-D  
displacement

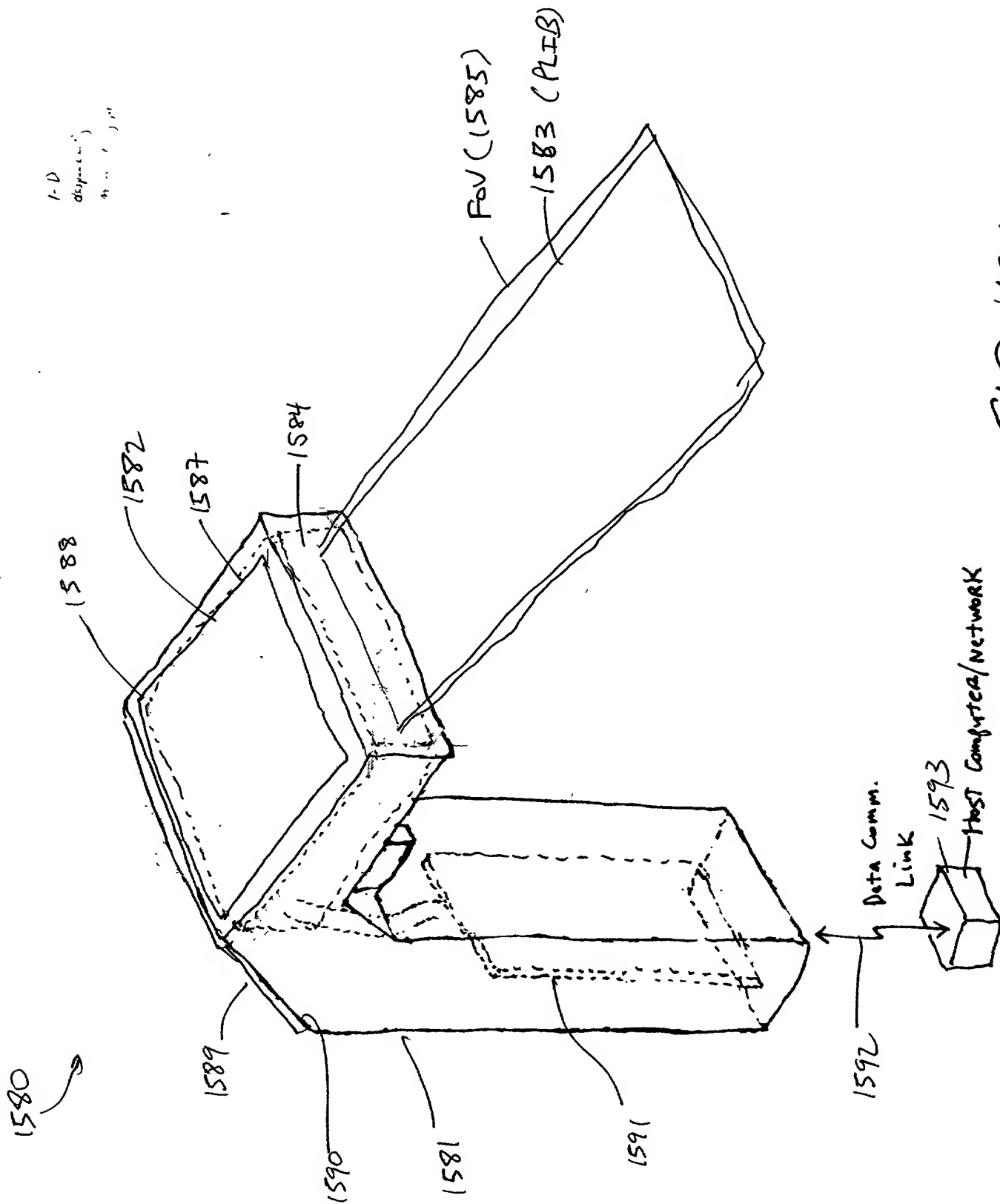


FIG. 43A

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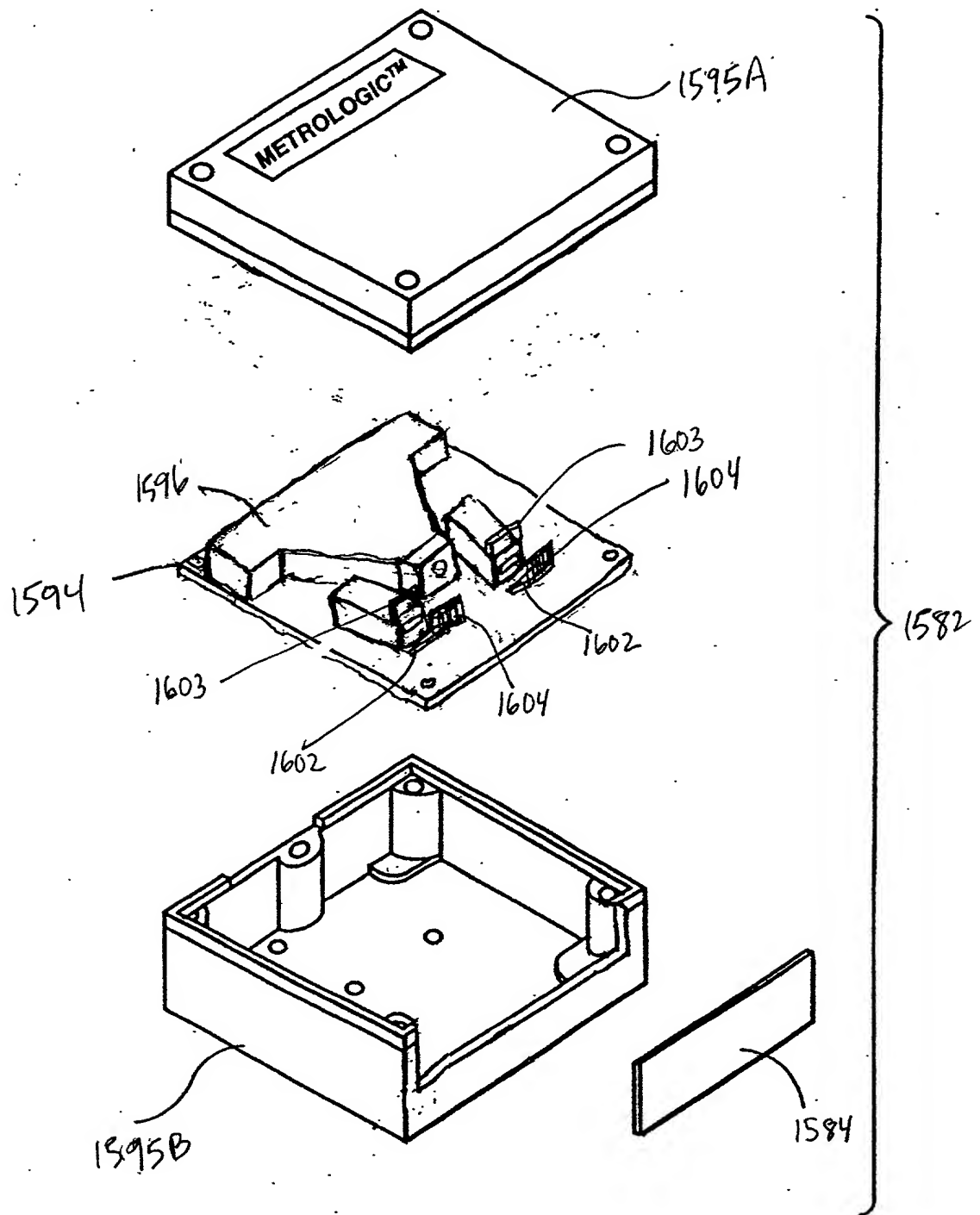
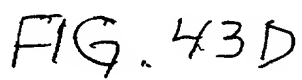
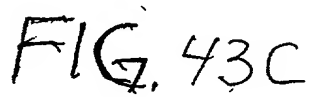


FIG. 43B



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10067410.020401

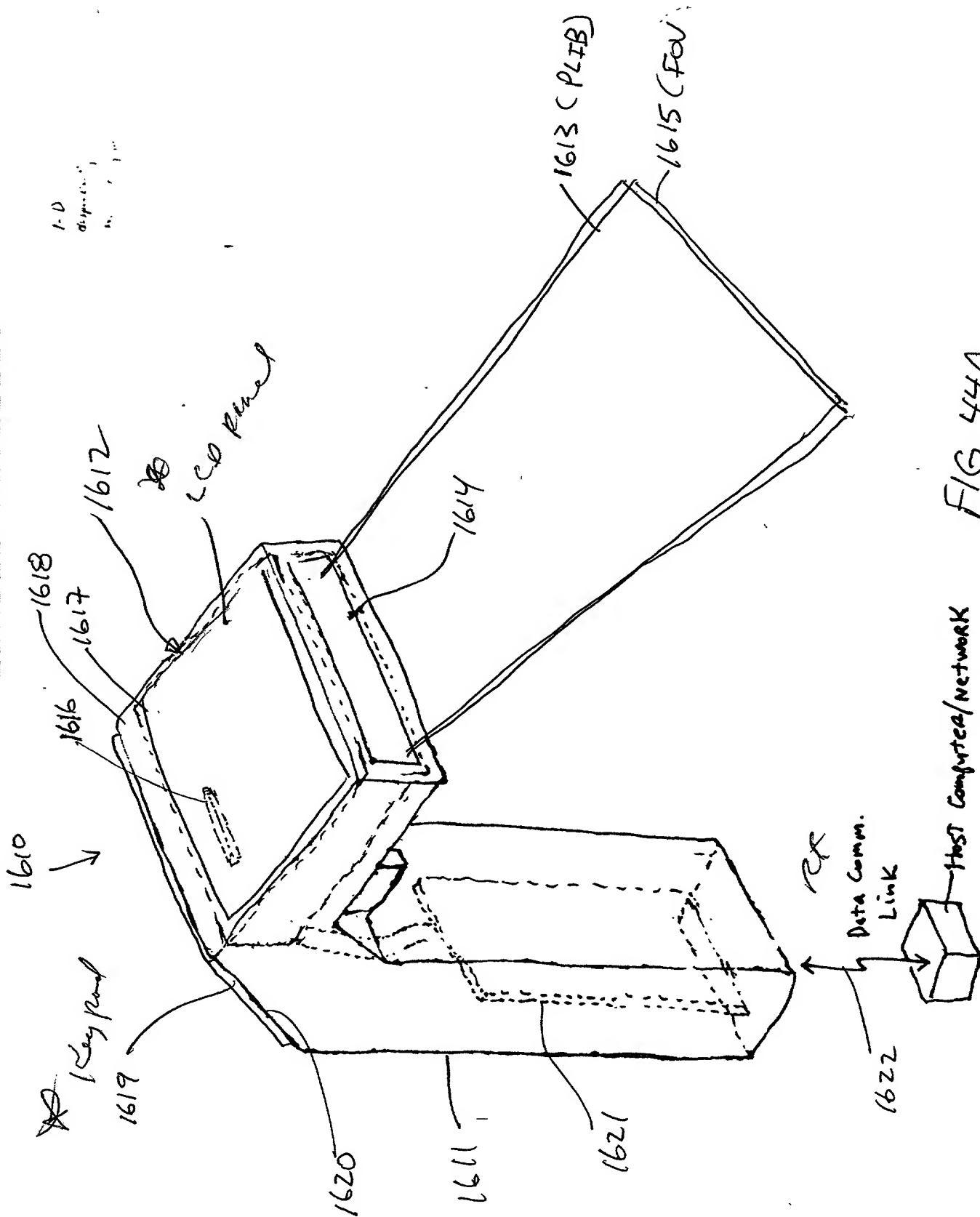


FIG. 44A

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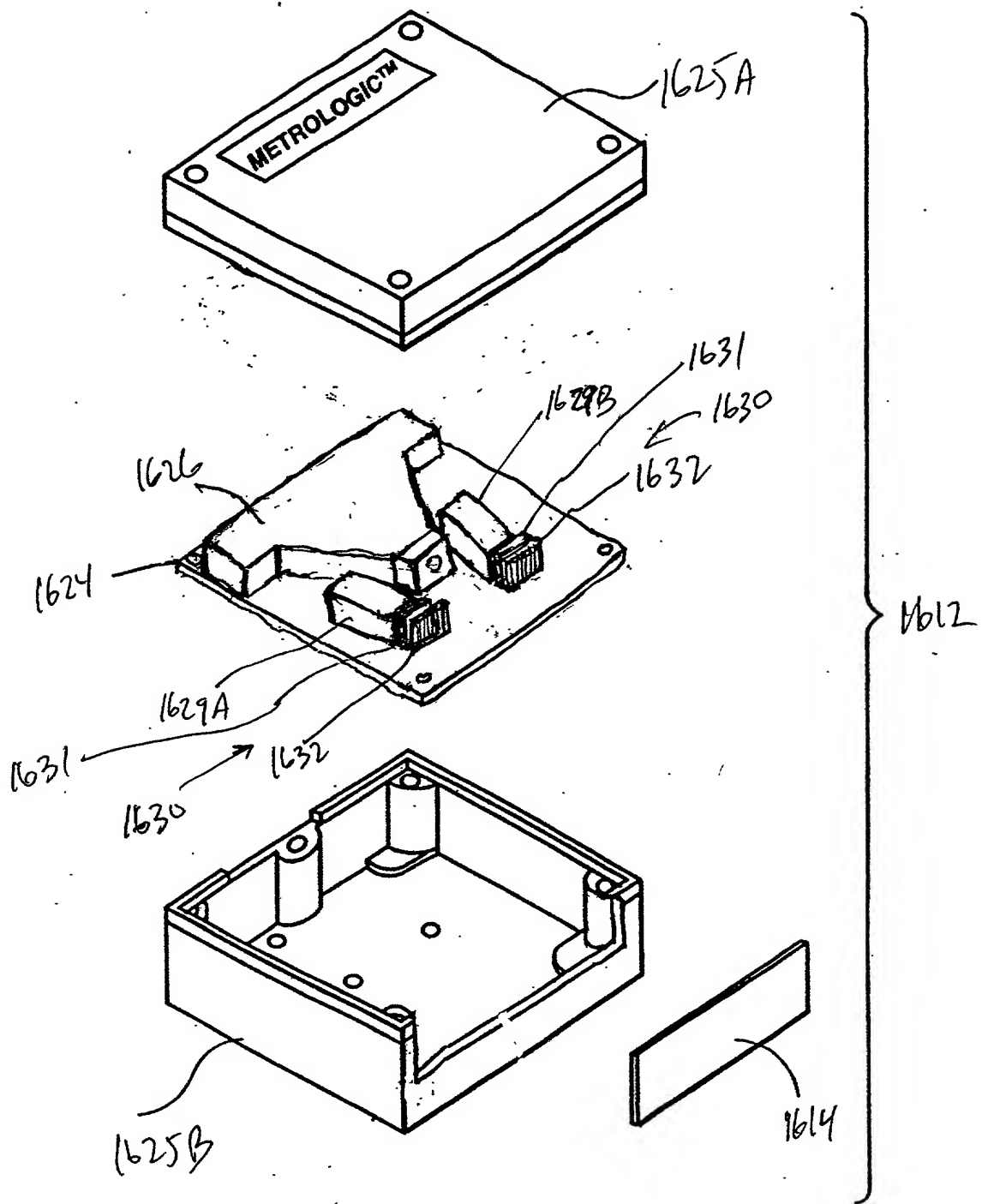


FIG. 44B



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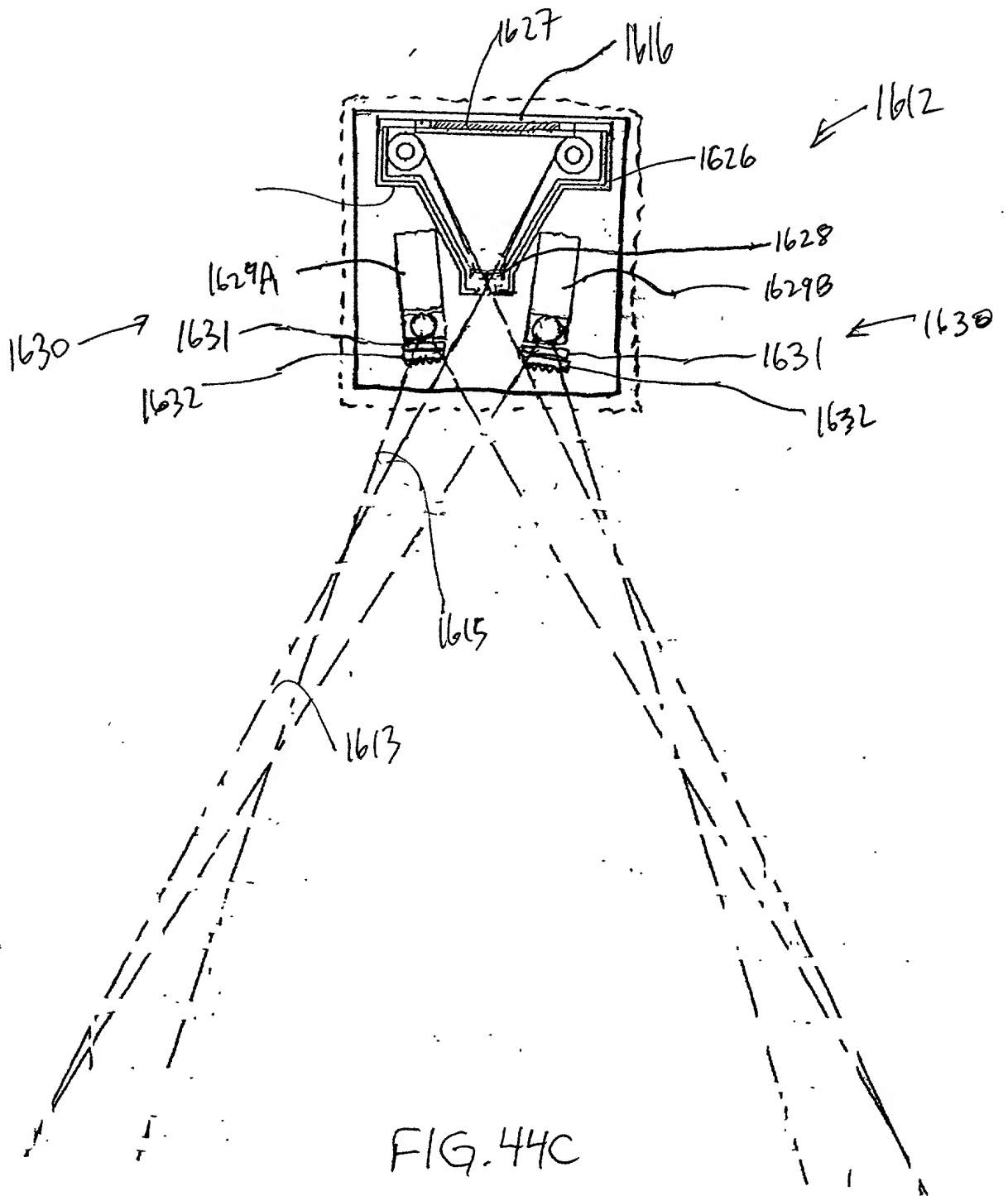
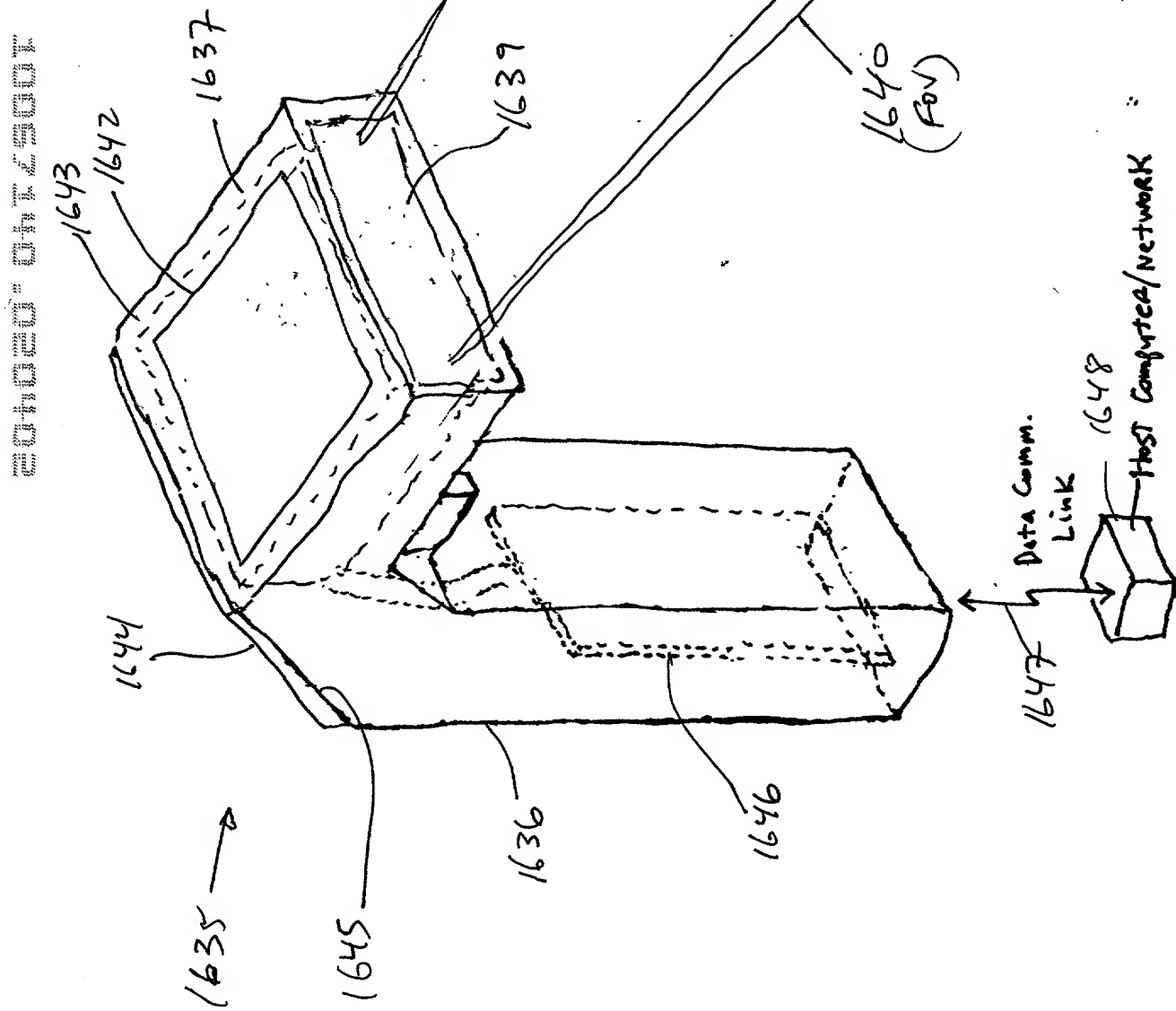


FIG. 44C

1-D  
desperately  
... ..

[illegible]

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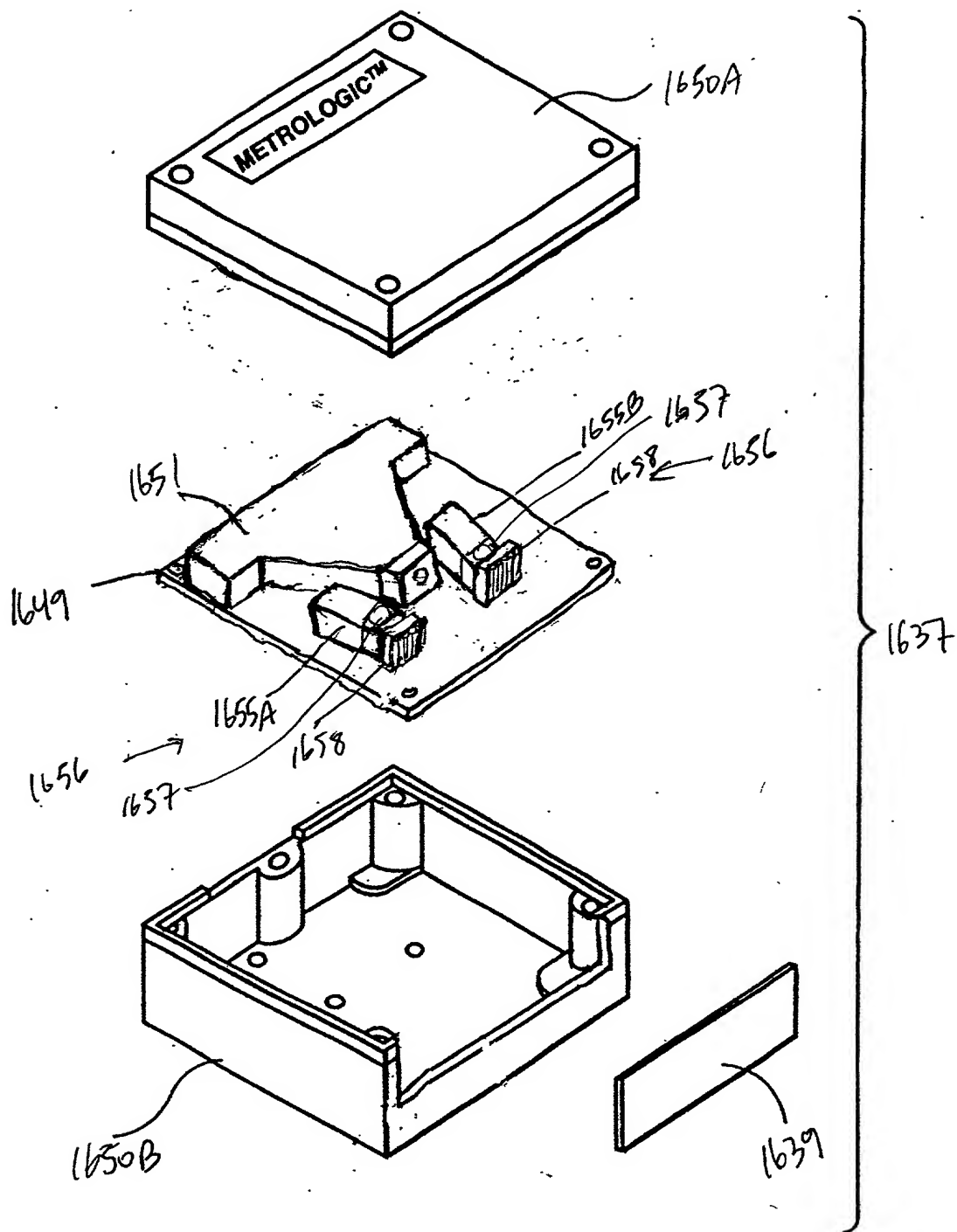


FIG. 45B

273/332

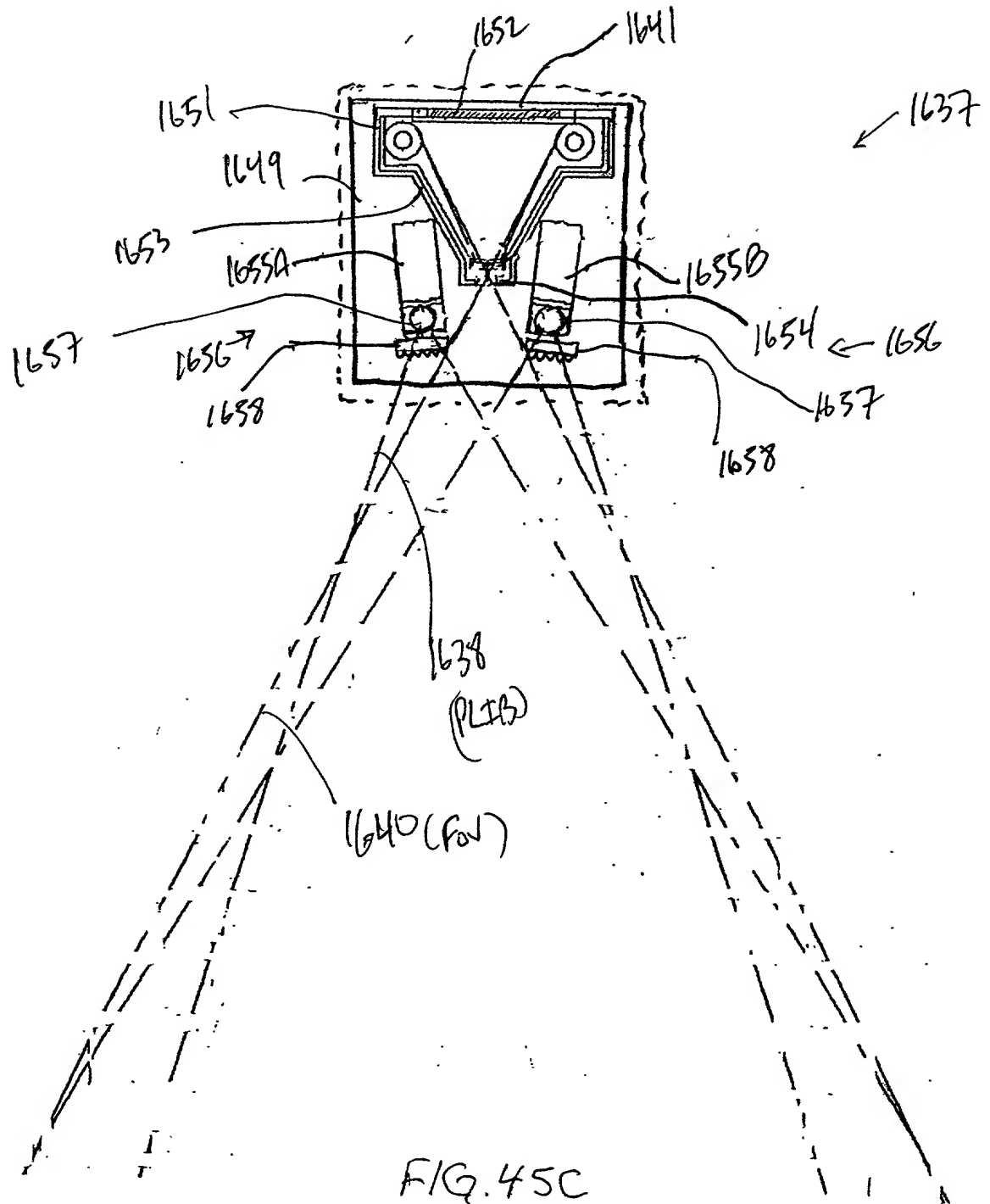


FIG. 45C

20102004125001



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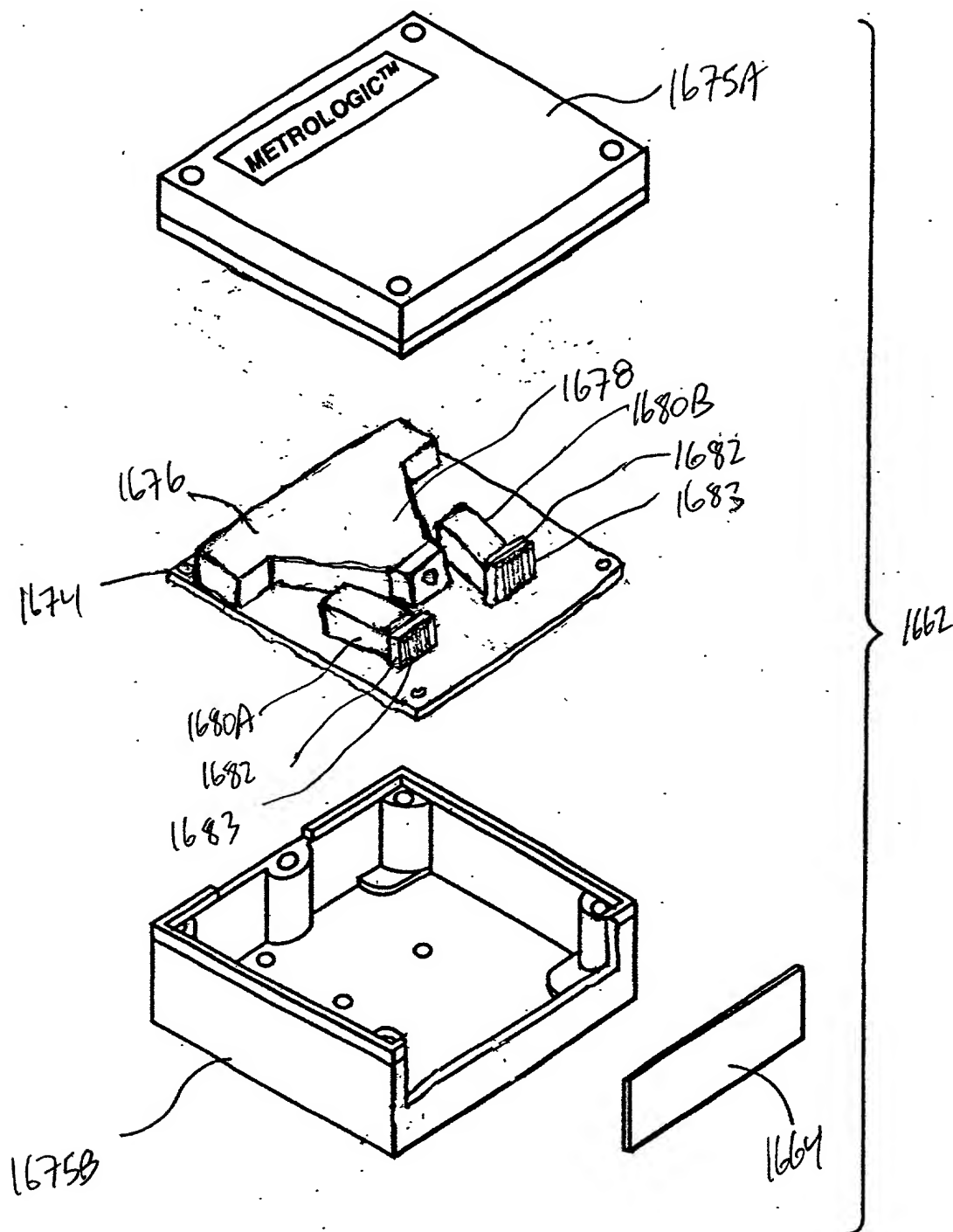


FIG. 46B

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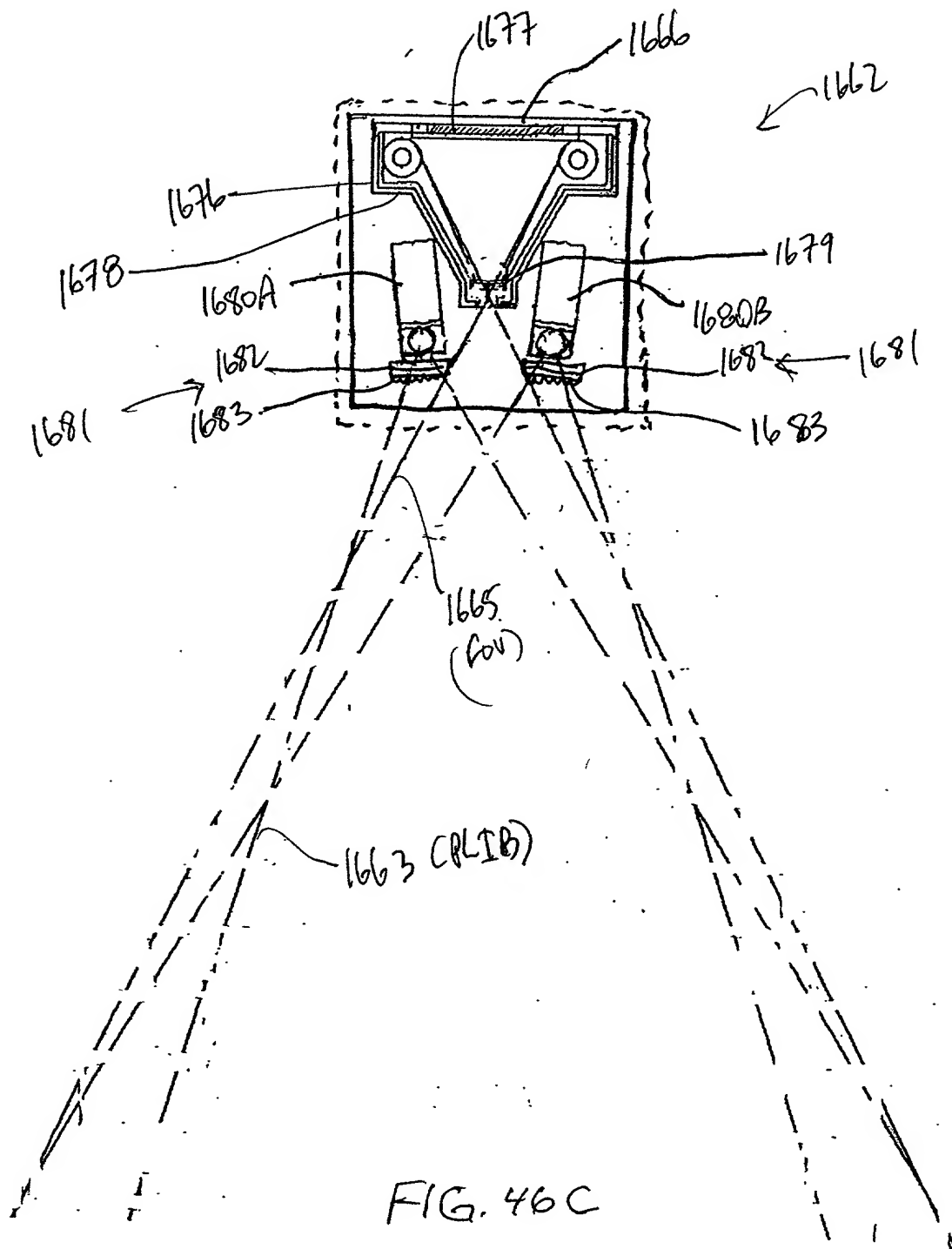


FIG. 46C

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1-D  
display  
...

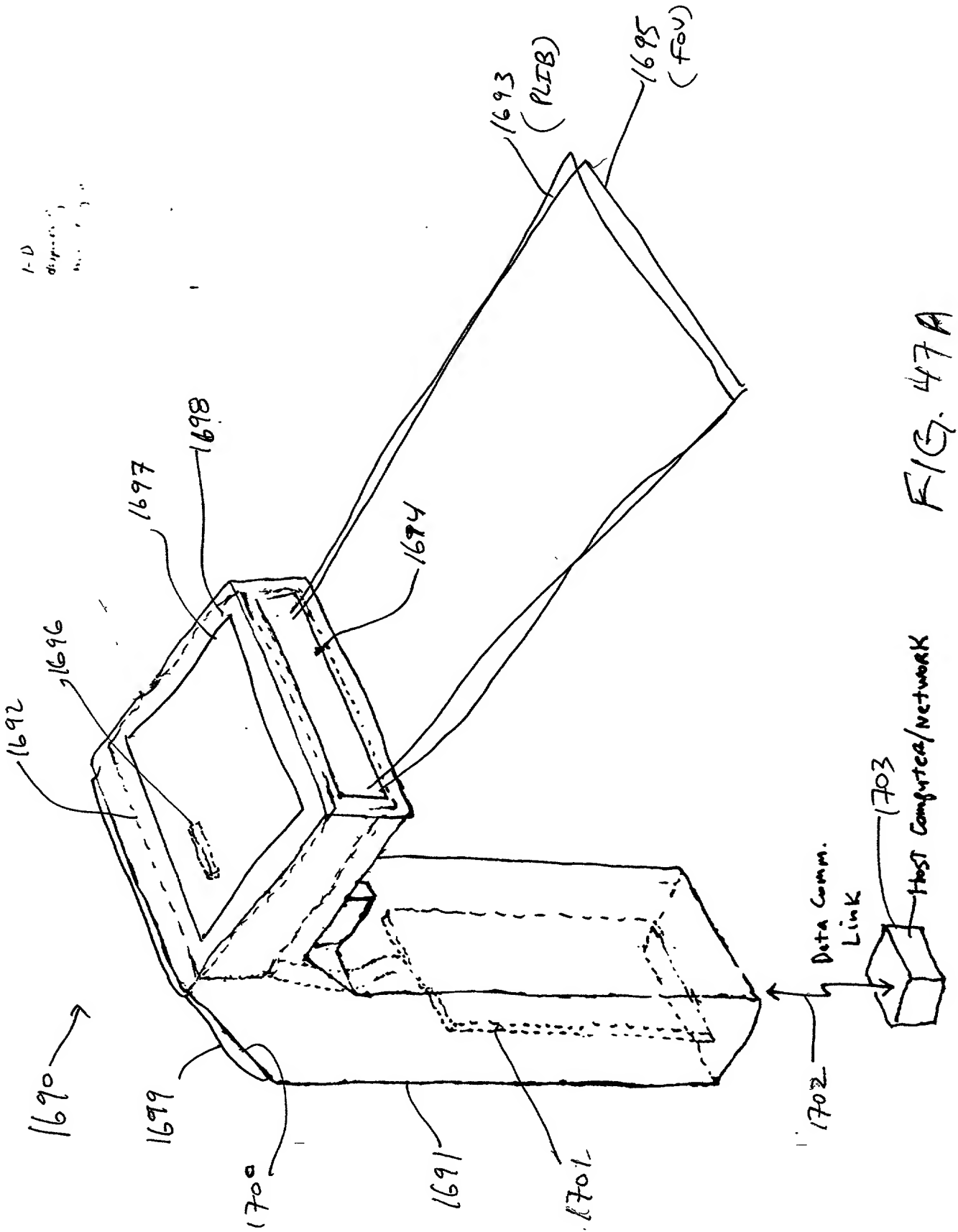


FIG. 47A



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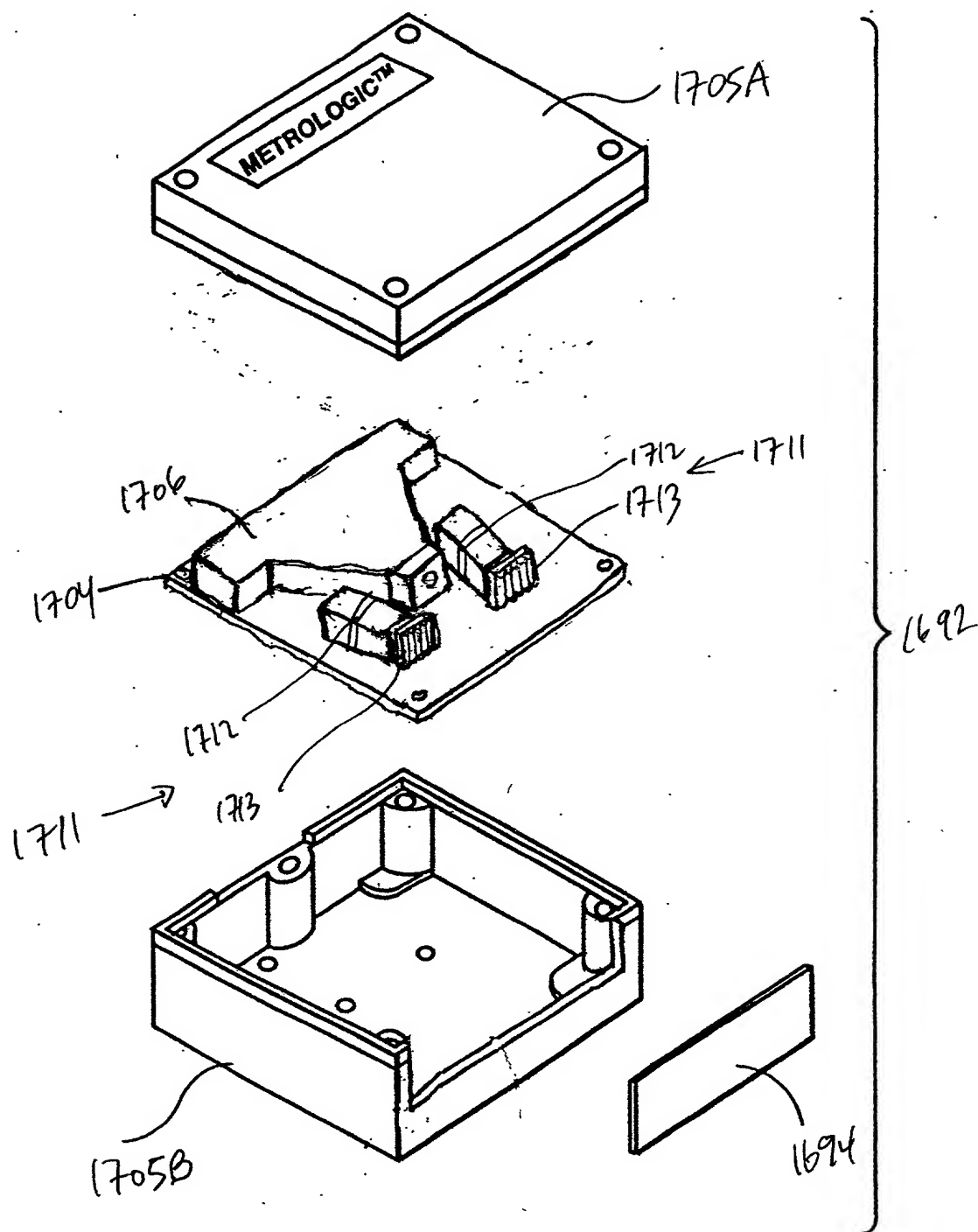


FIG. 47B

279/332

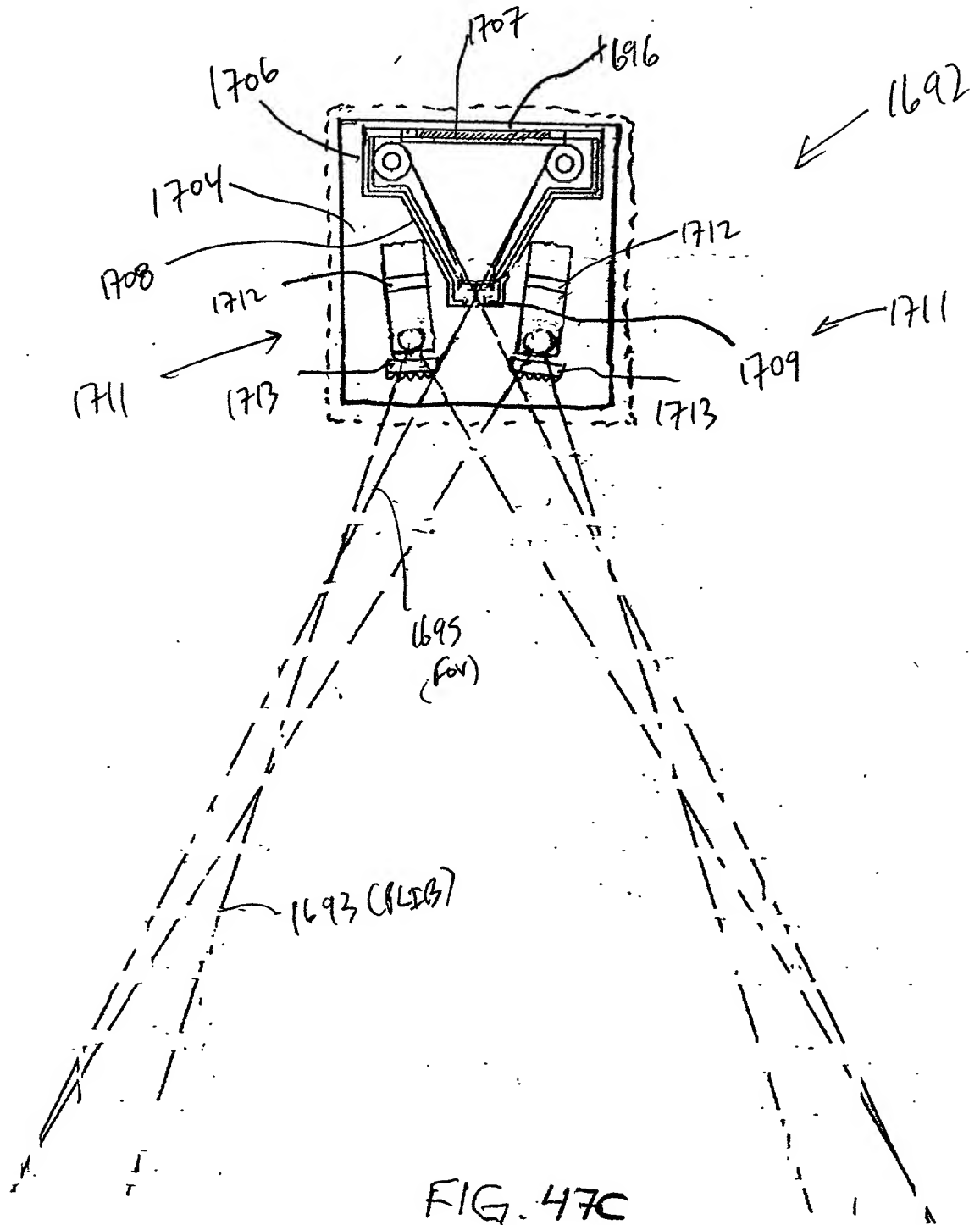


FIG. 47C

280/332

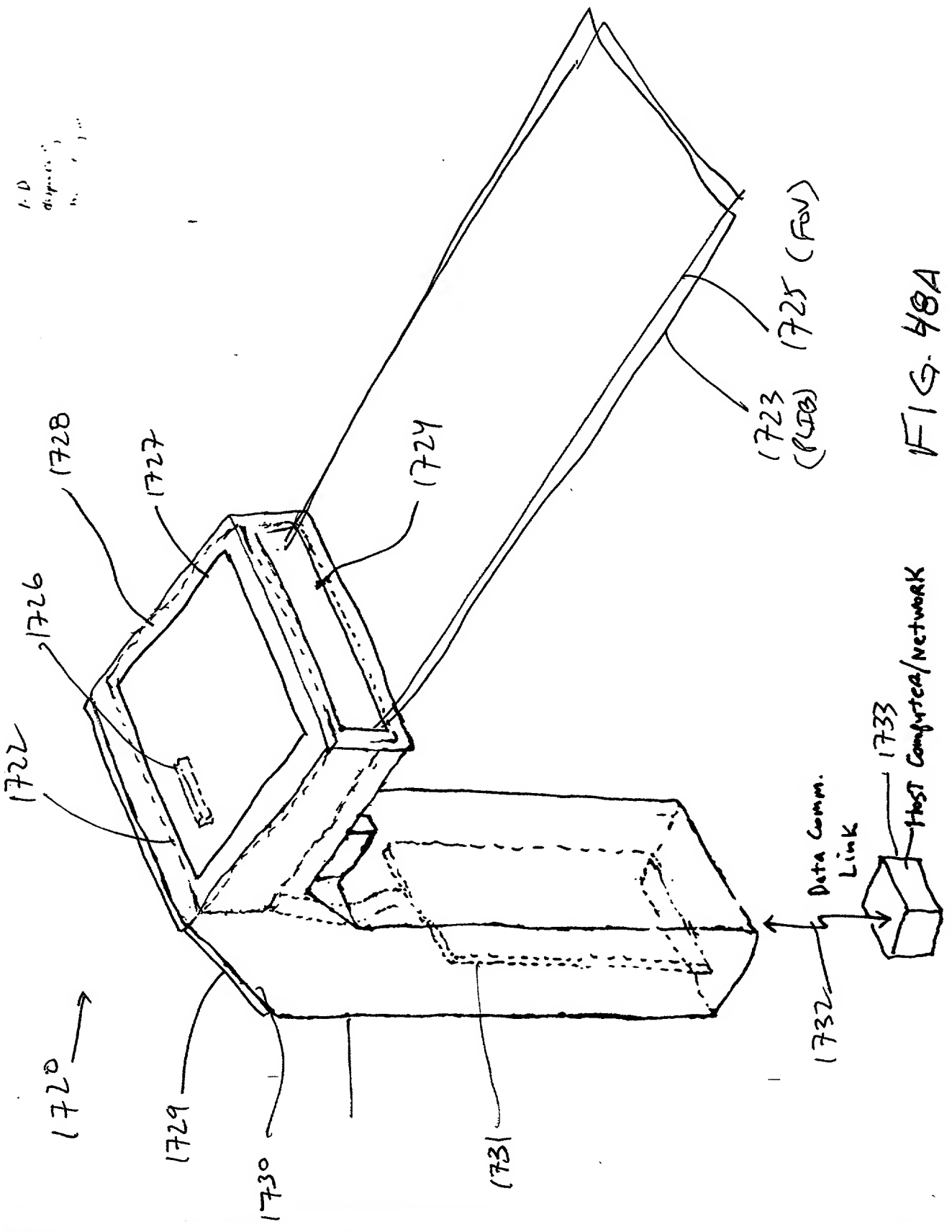


FIG. 48A

281/332

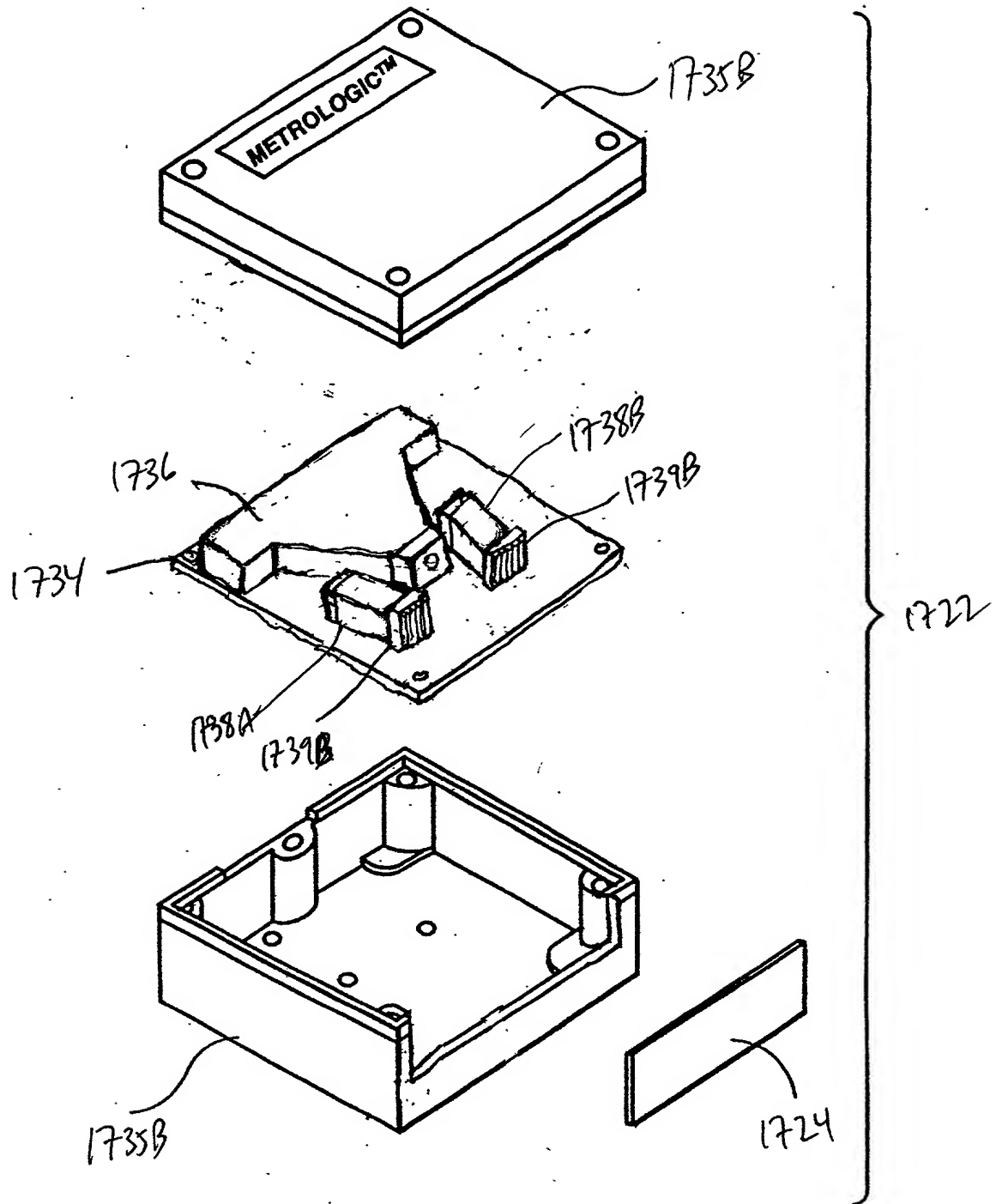


FIG. 48B

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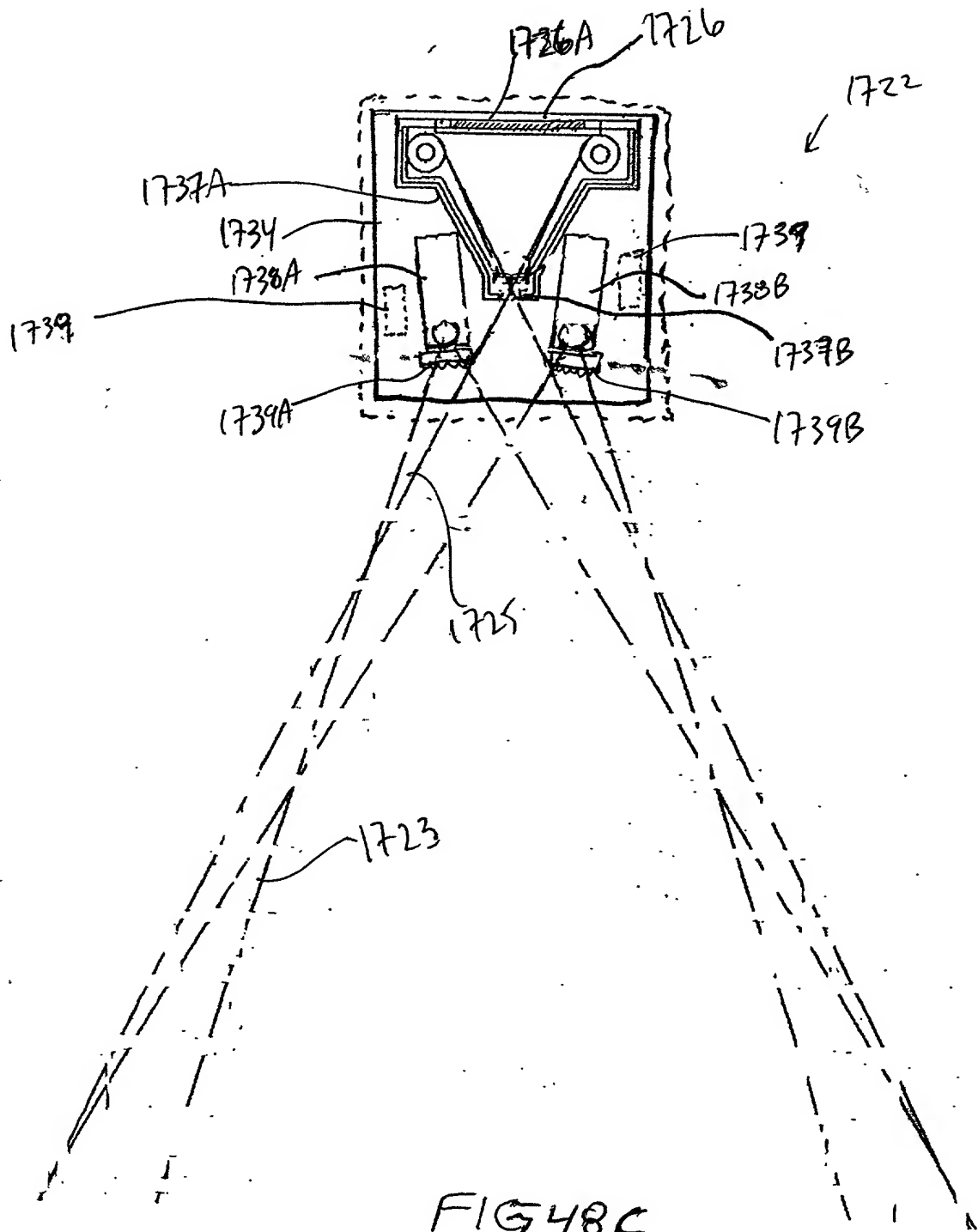


FIG. 48C

10067440 B01A

20100207 01123001

1-D  
display  
...

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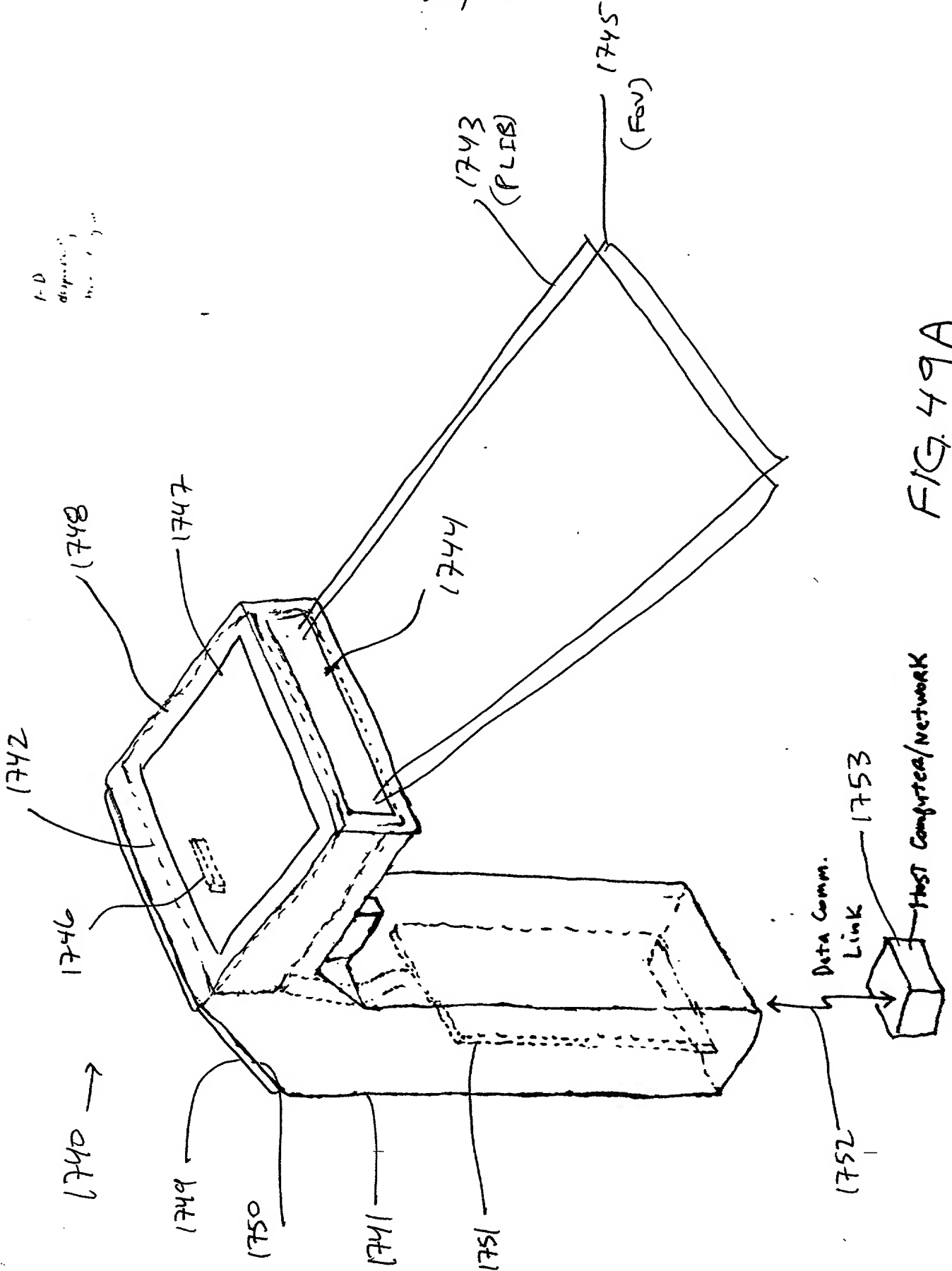


FIG. 49A

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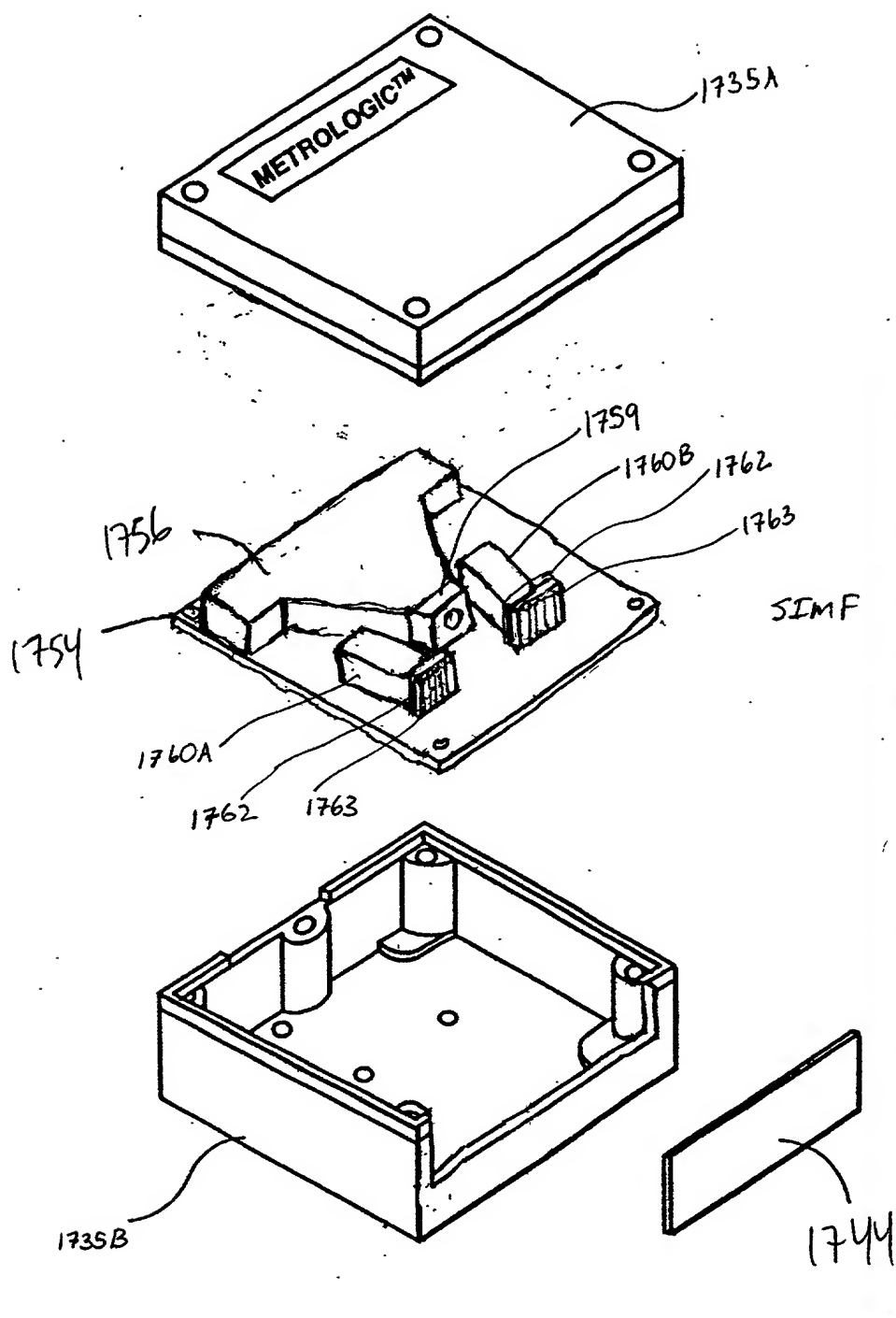


FIG. 49B

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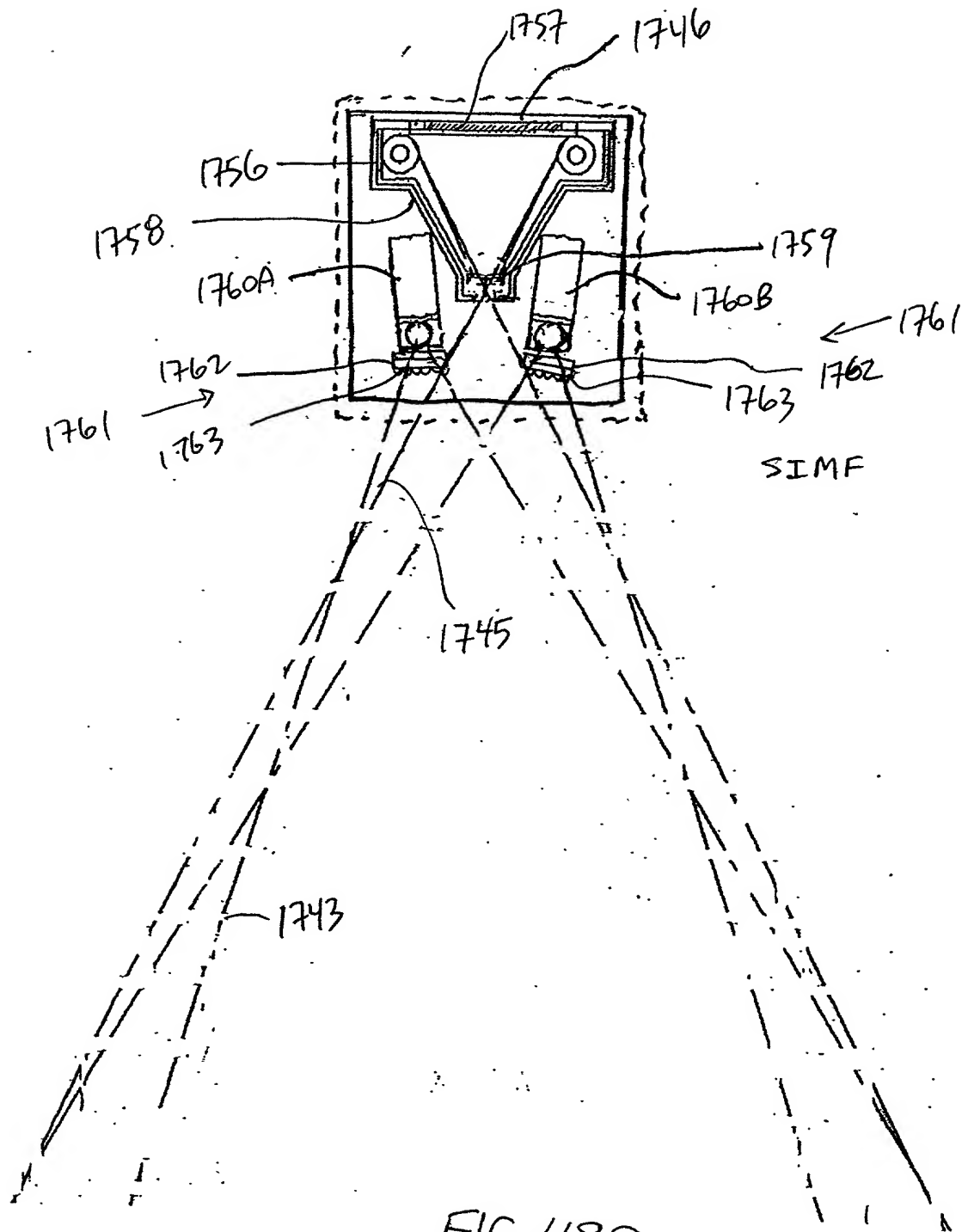
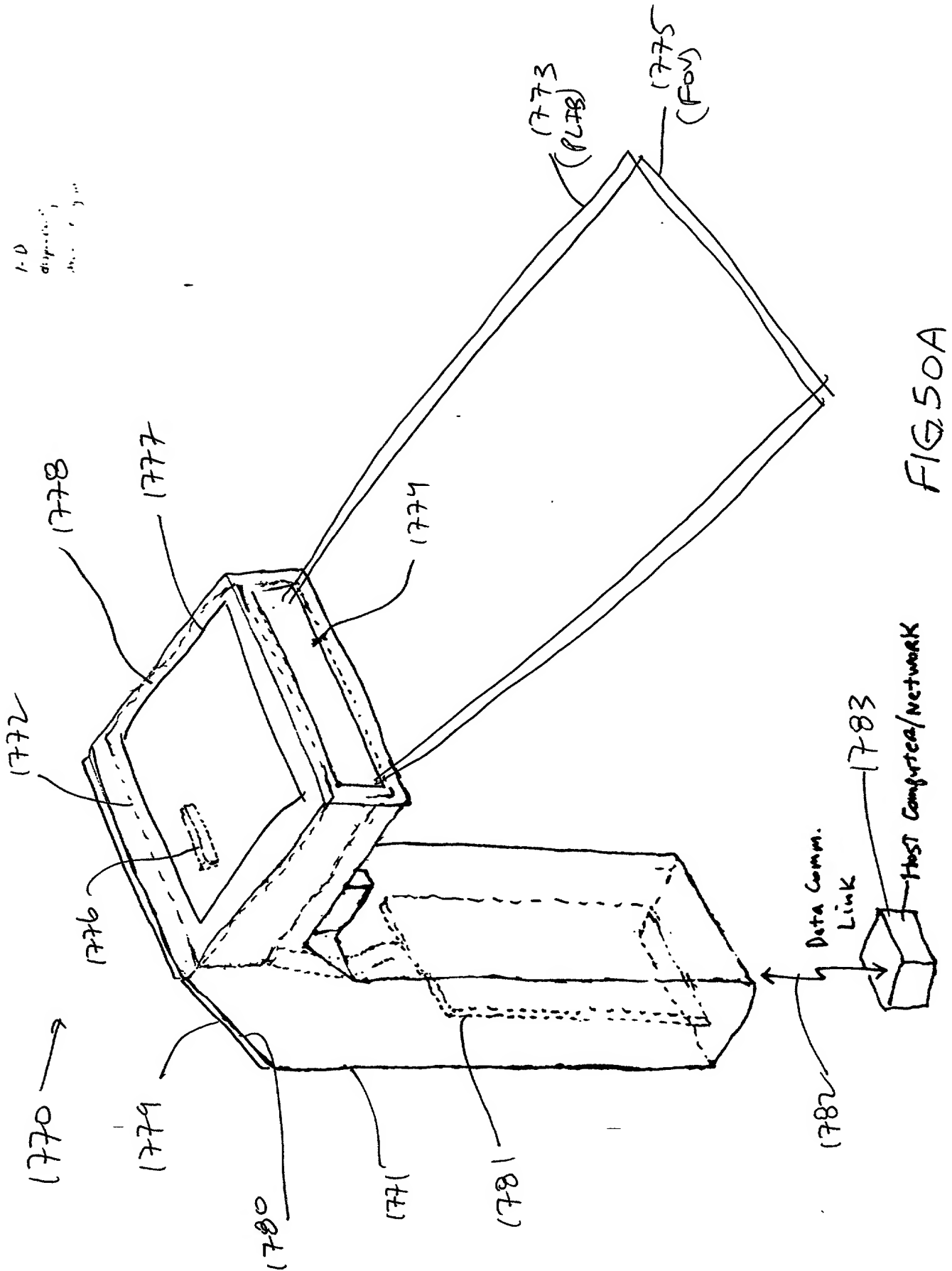


FIG.49C



1-D  
display  
...



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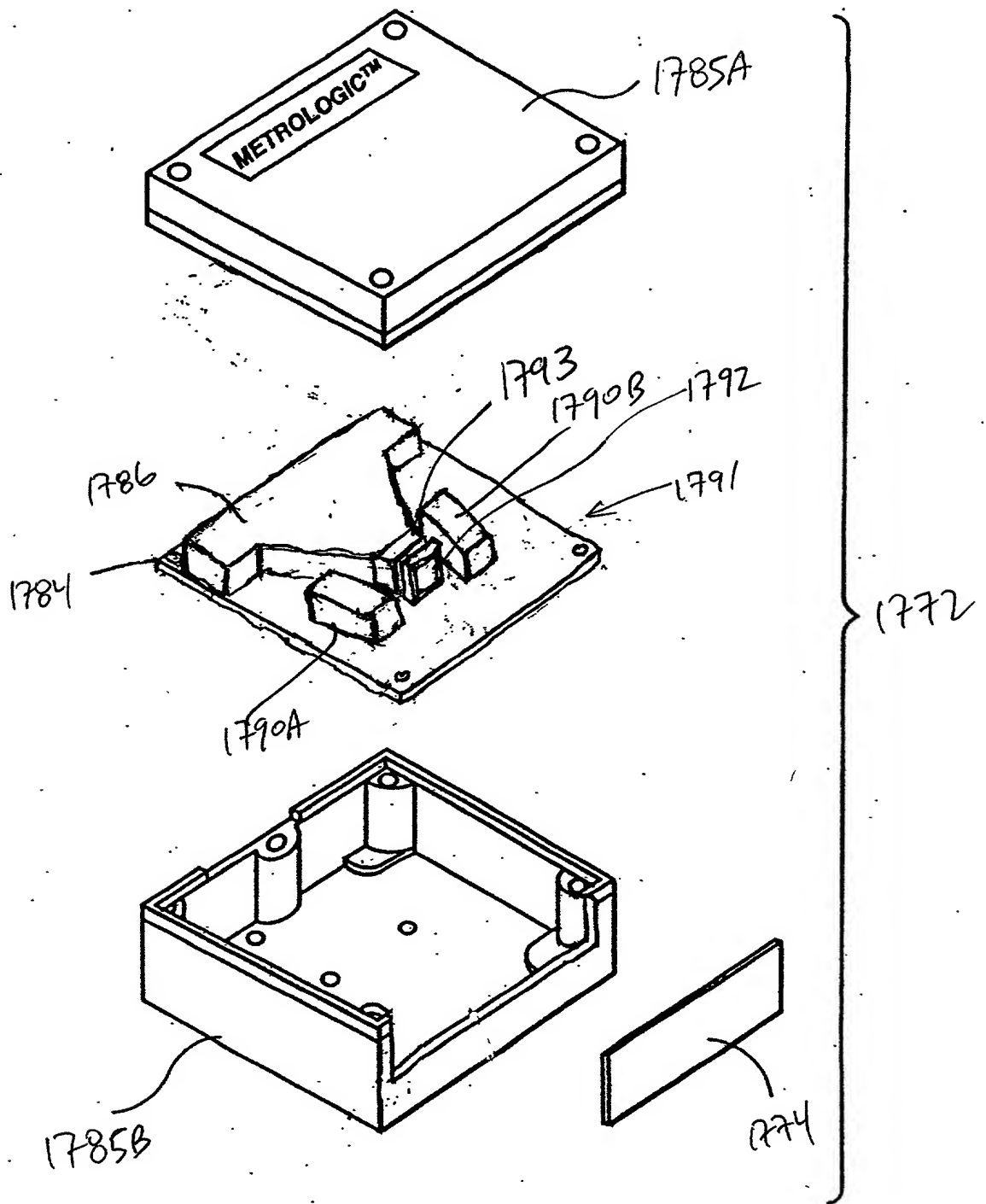


FIG. 50B

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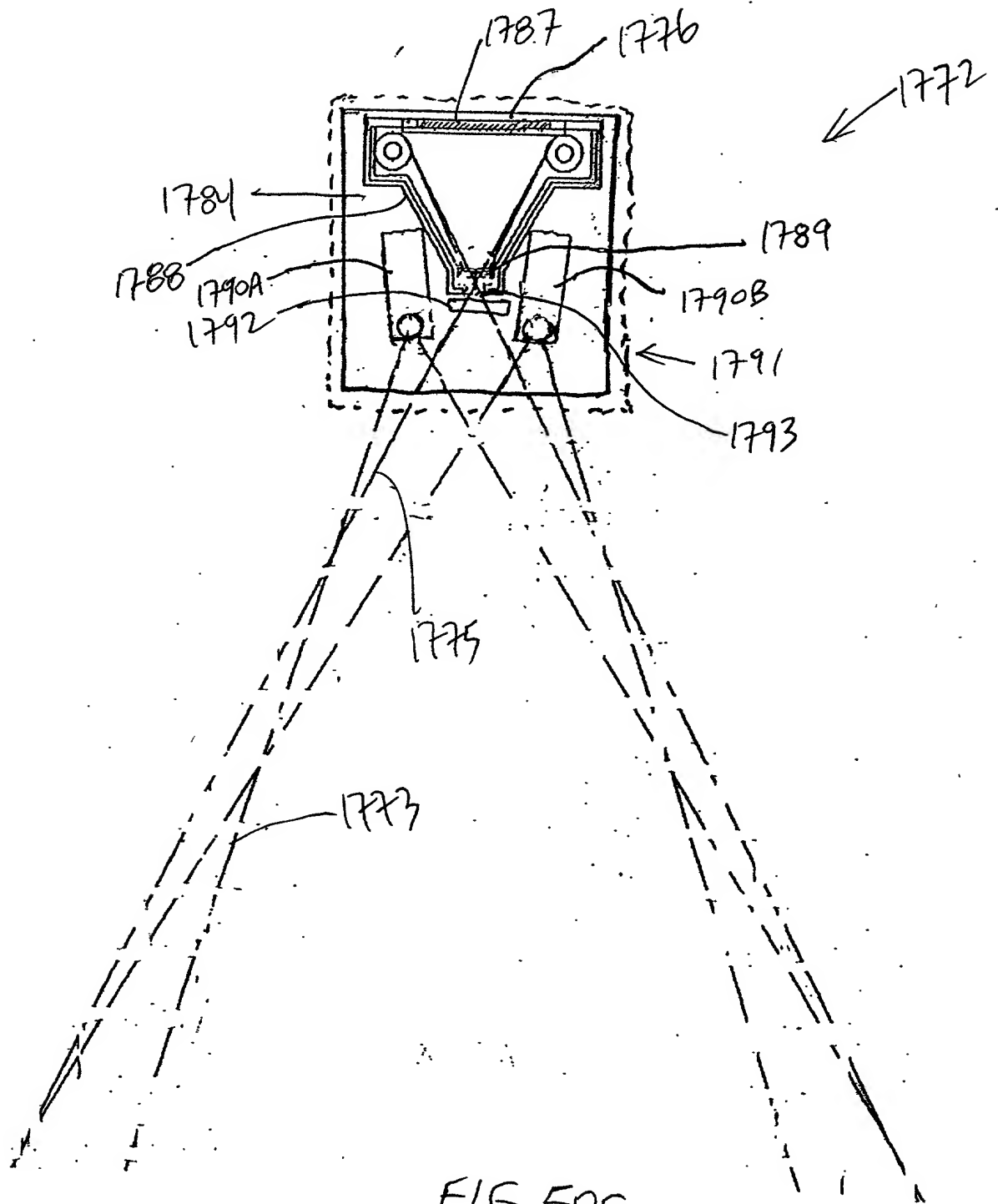


FIG. 50C

1-D  
display  
unit

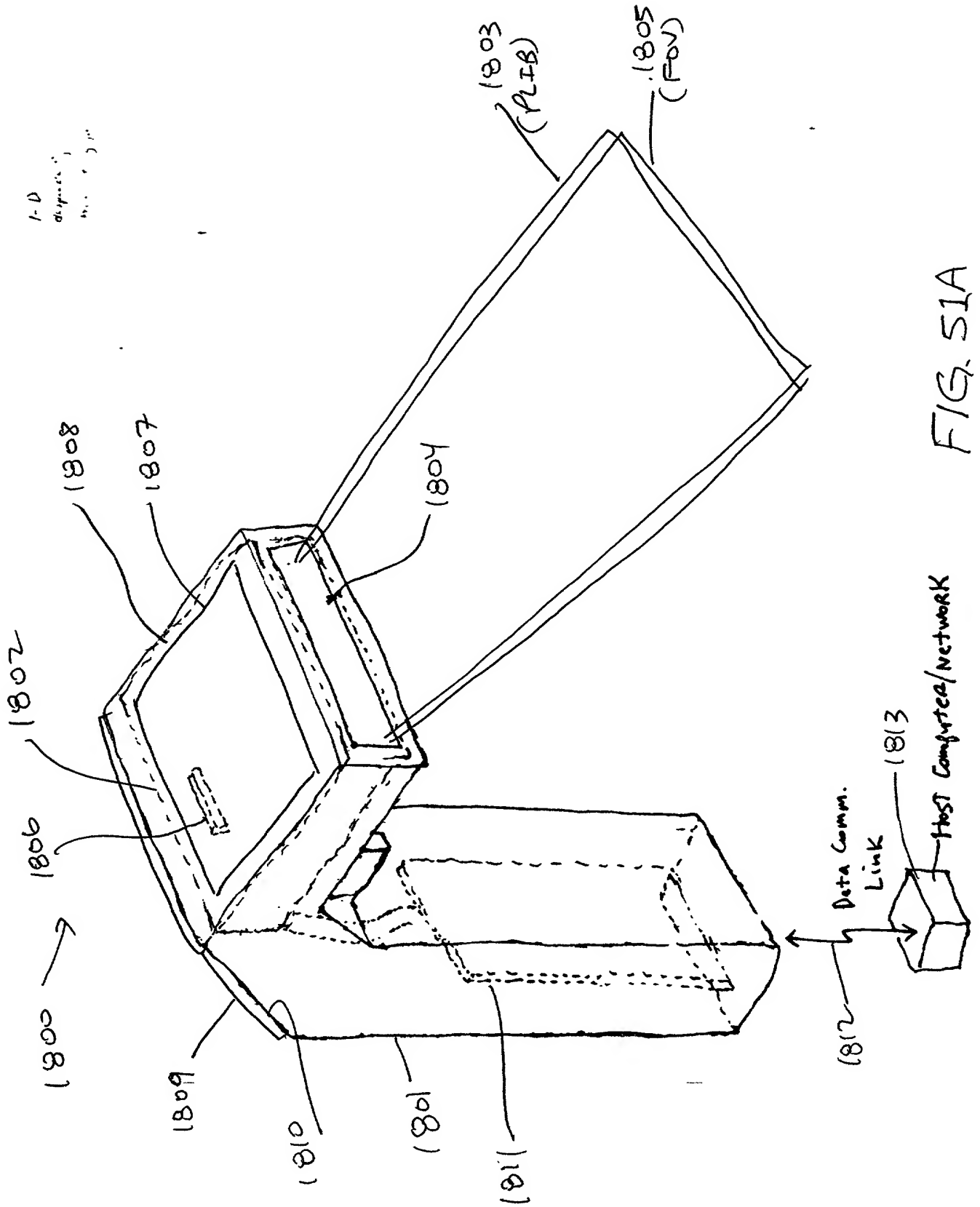


FIG. 51A

290/332

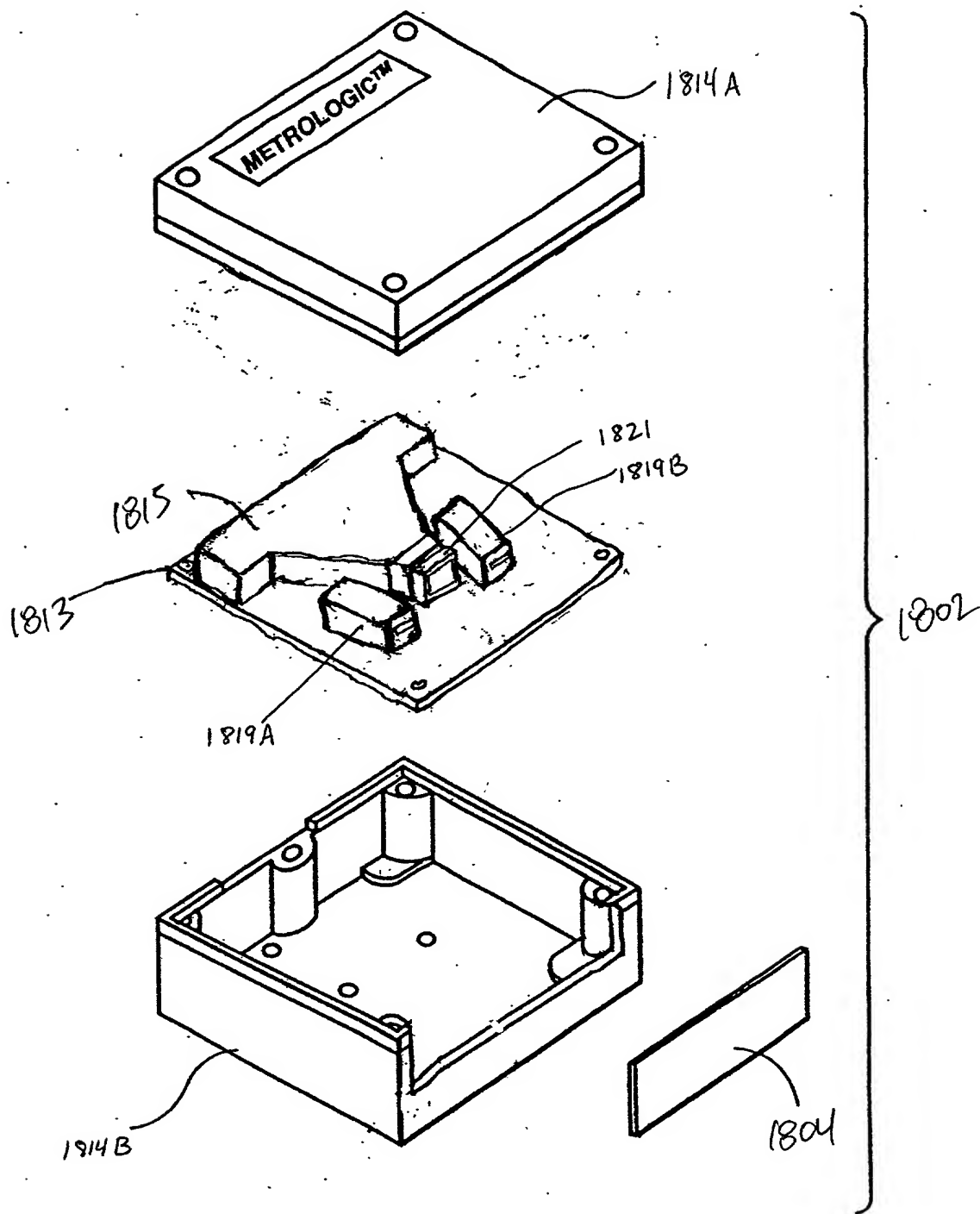
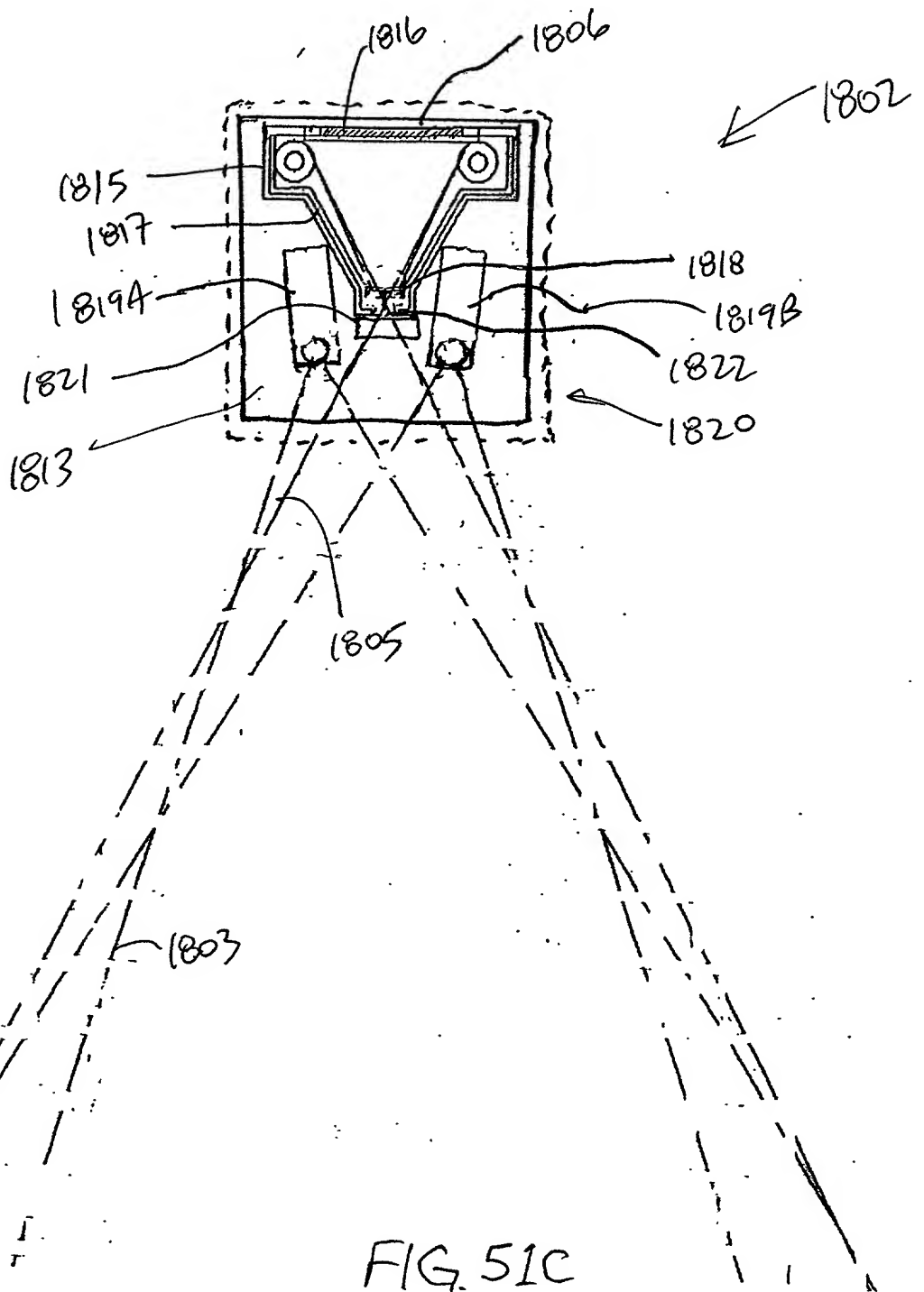


FIG. 51B

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10057410-200405

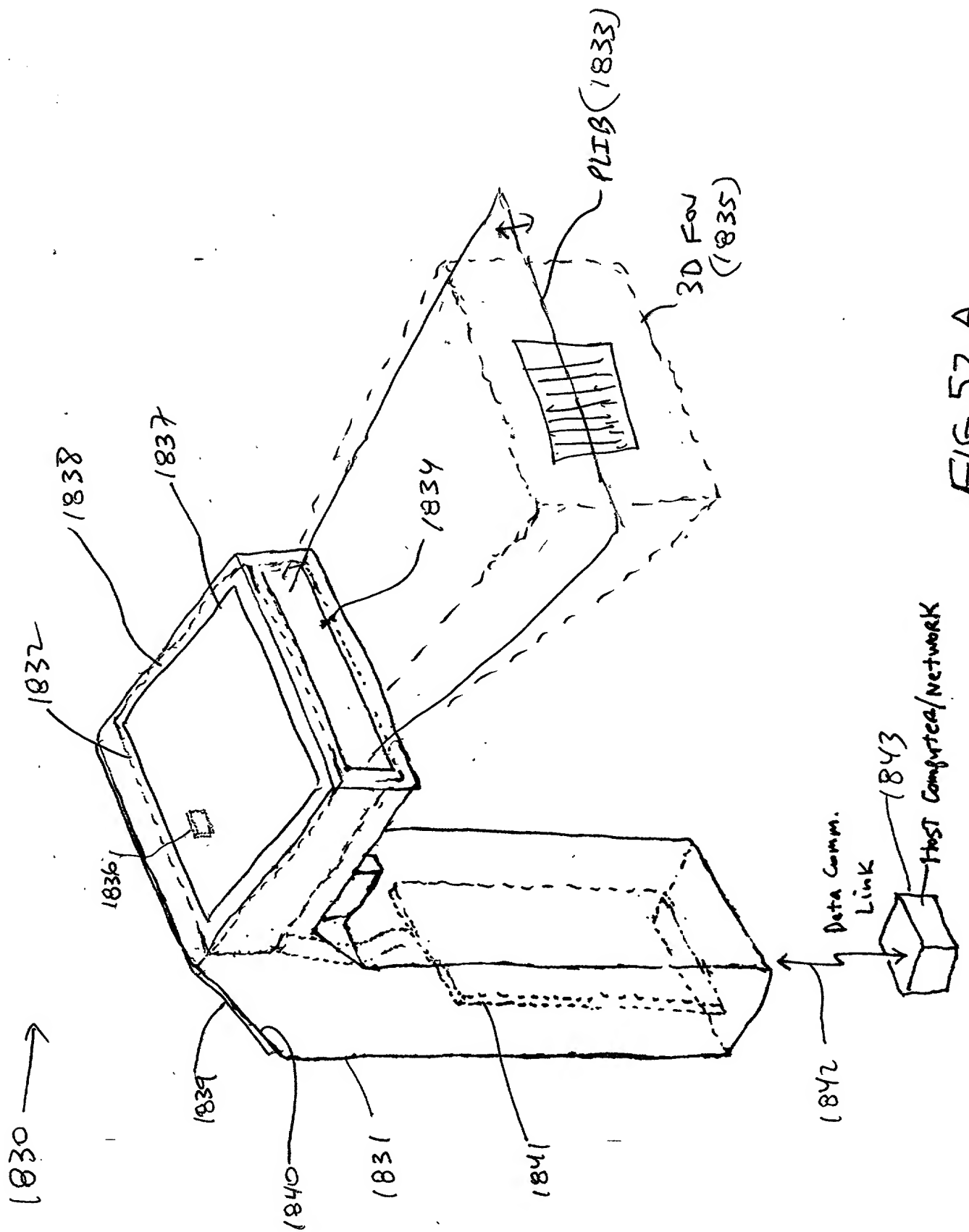


FIG. 52A

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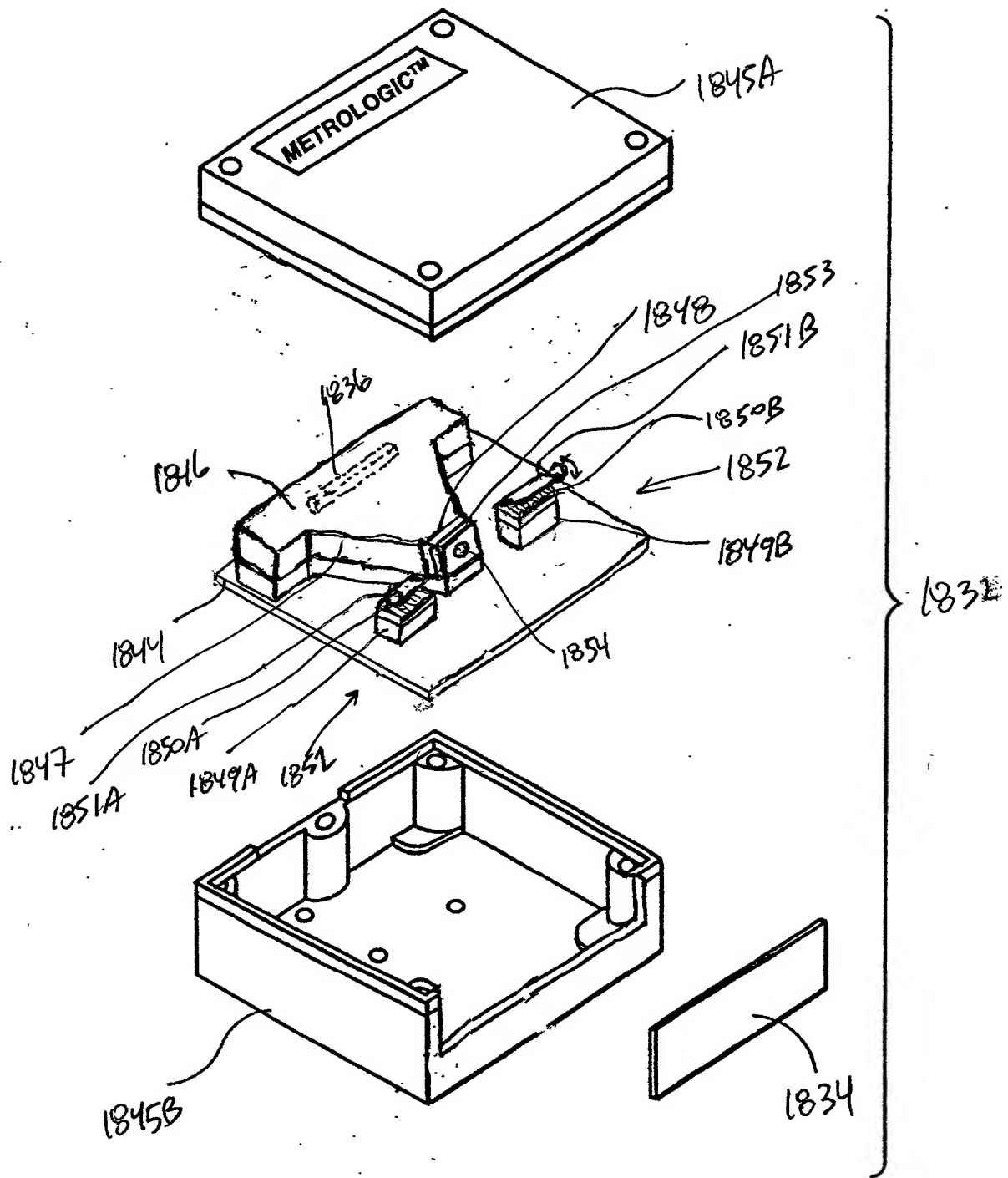


FIG. 52B

Fig. 1I 3A-3B



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1860 →

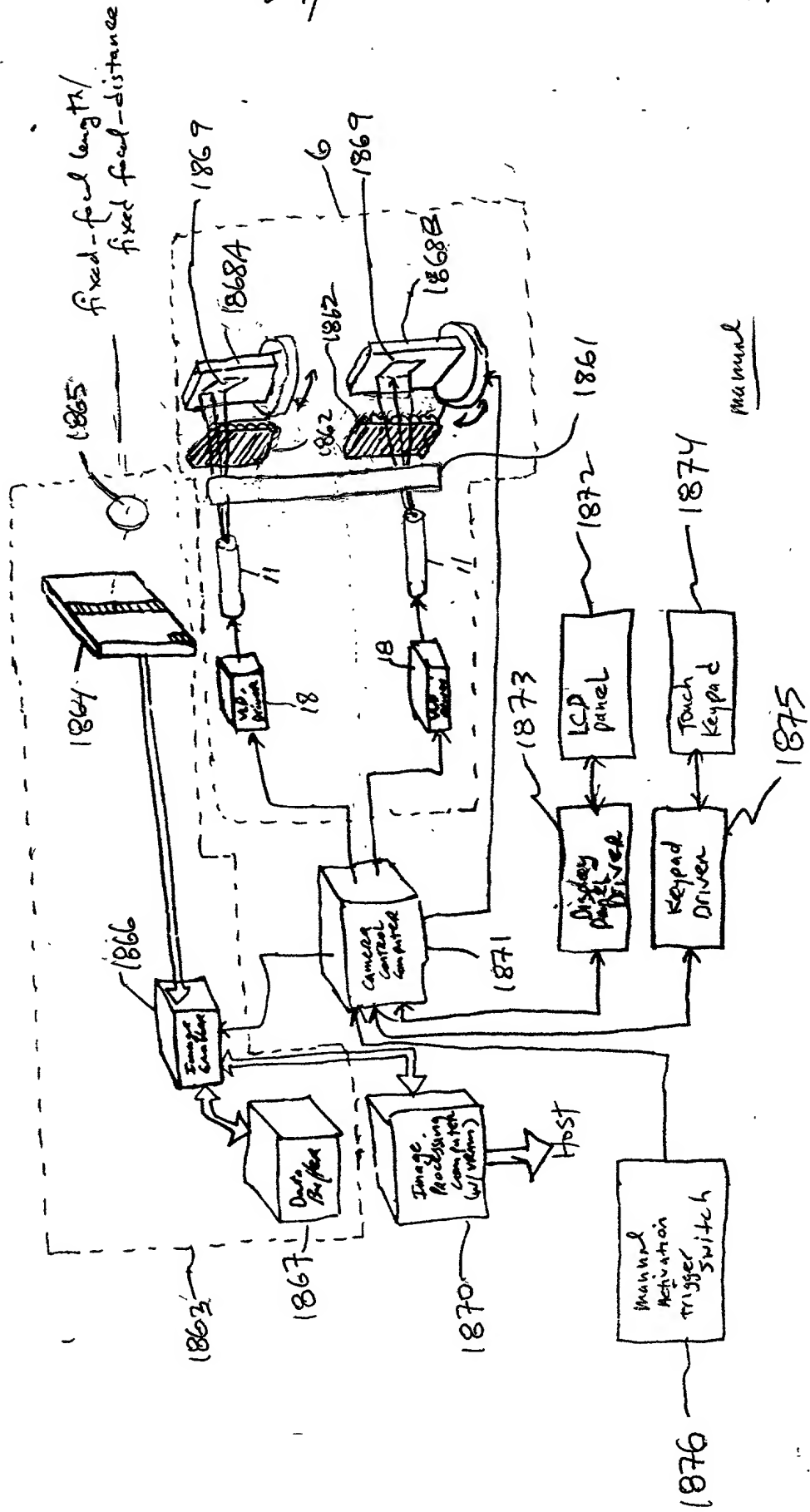


FIG. 53A1

1980

fixed-focal length /  
fixed focal-distance

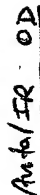


FIG. 53A2

2002

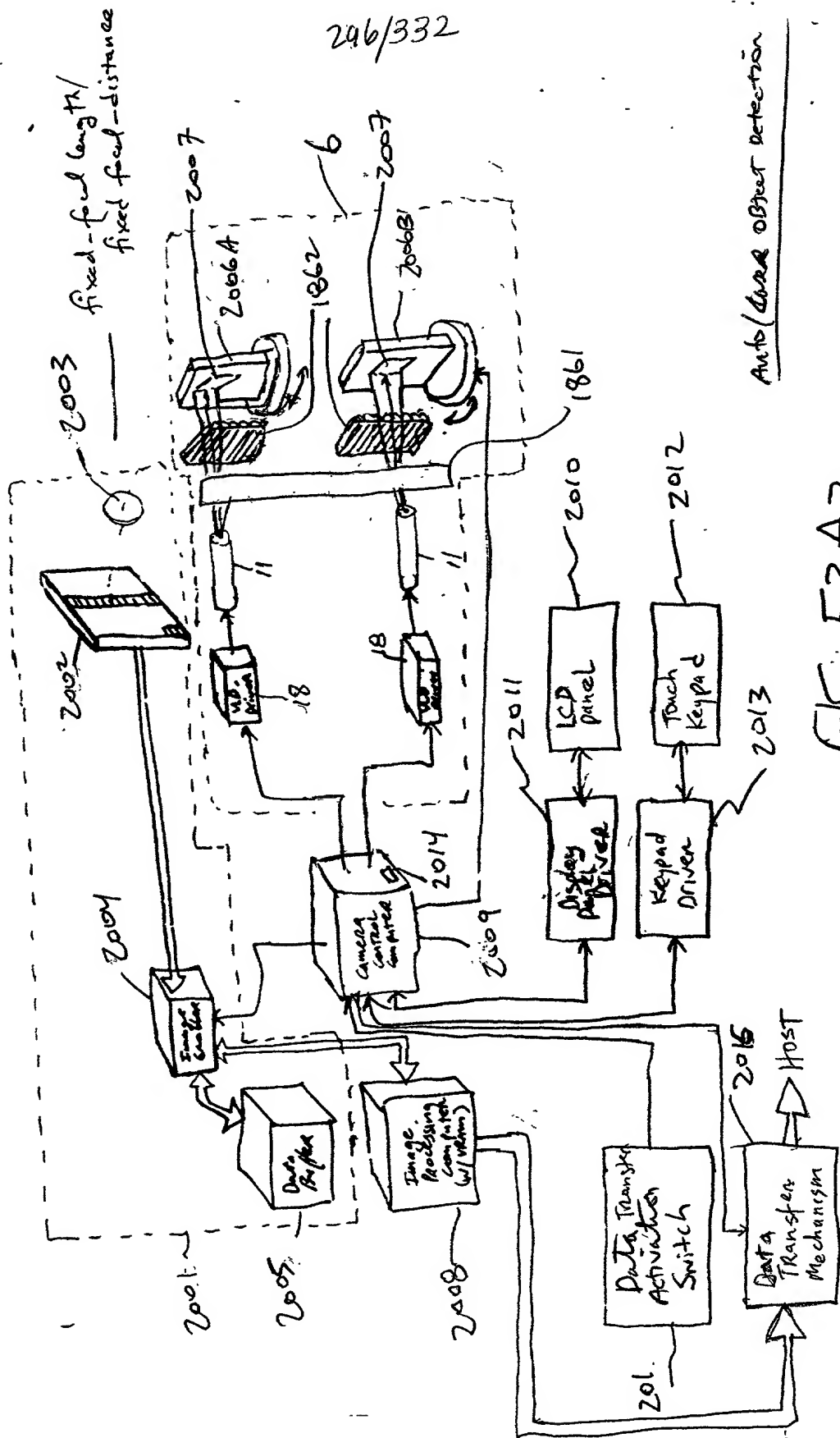
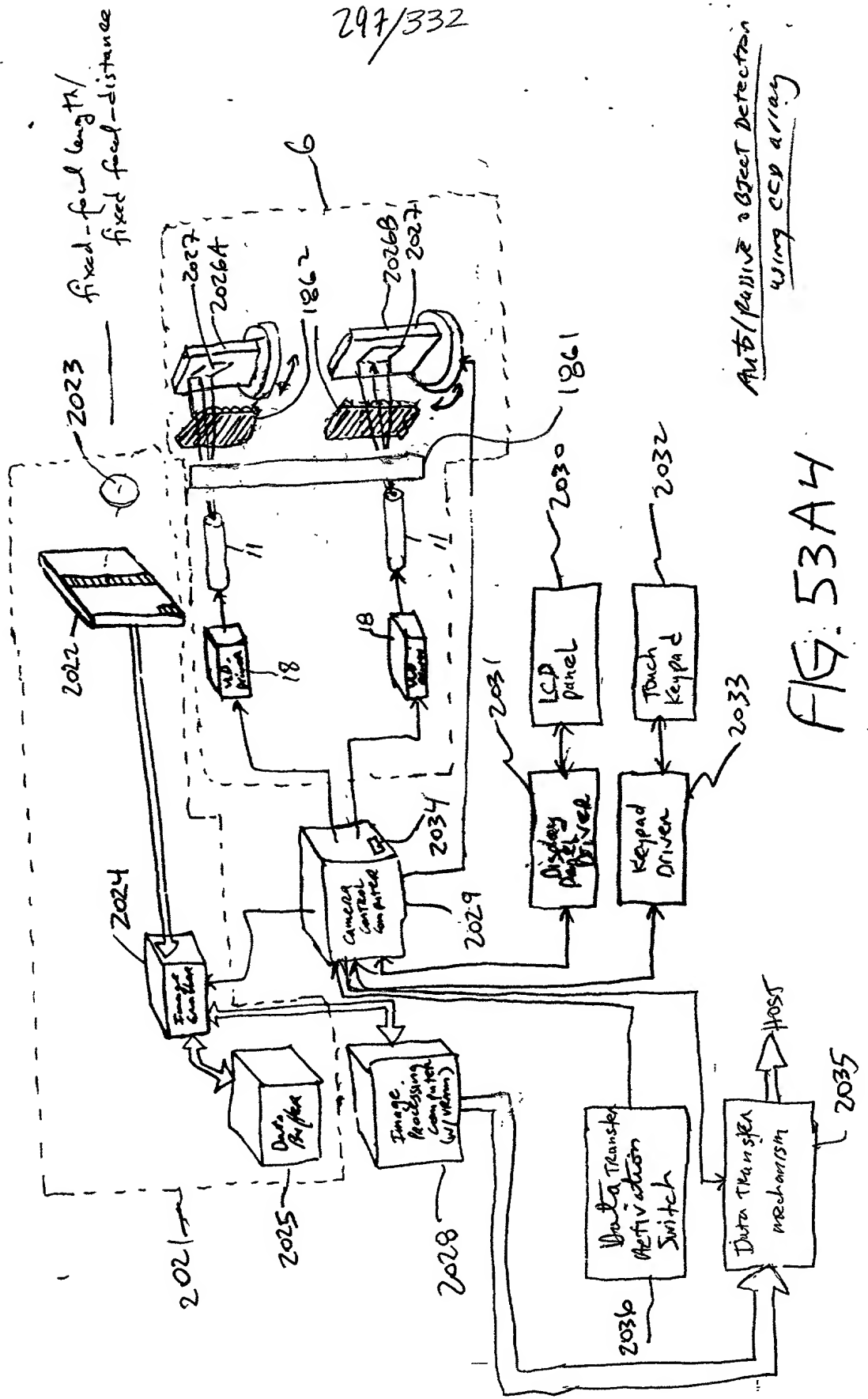


FIG. 53A3

Auto/Manual object detection

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202 →





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2060 →

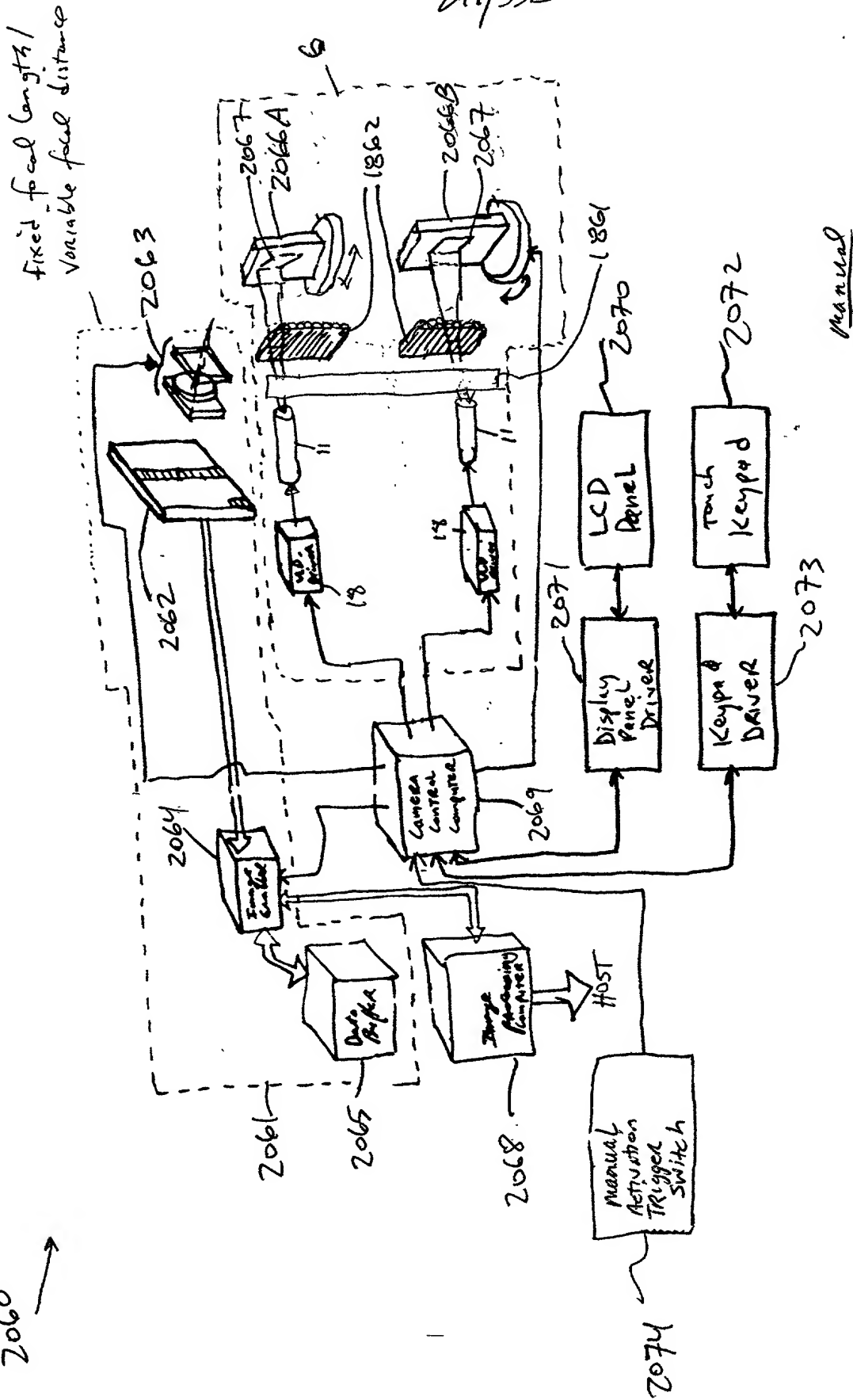



FIG. 53B1

2080 



2096

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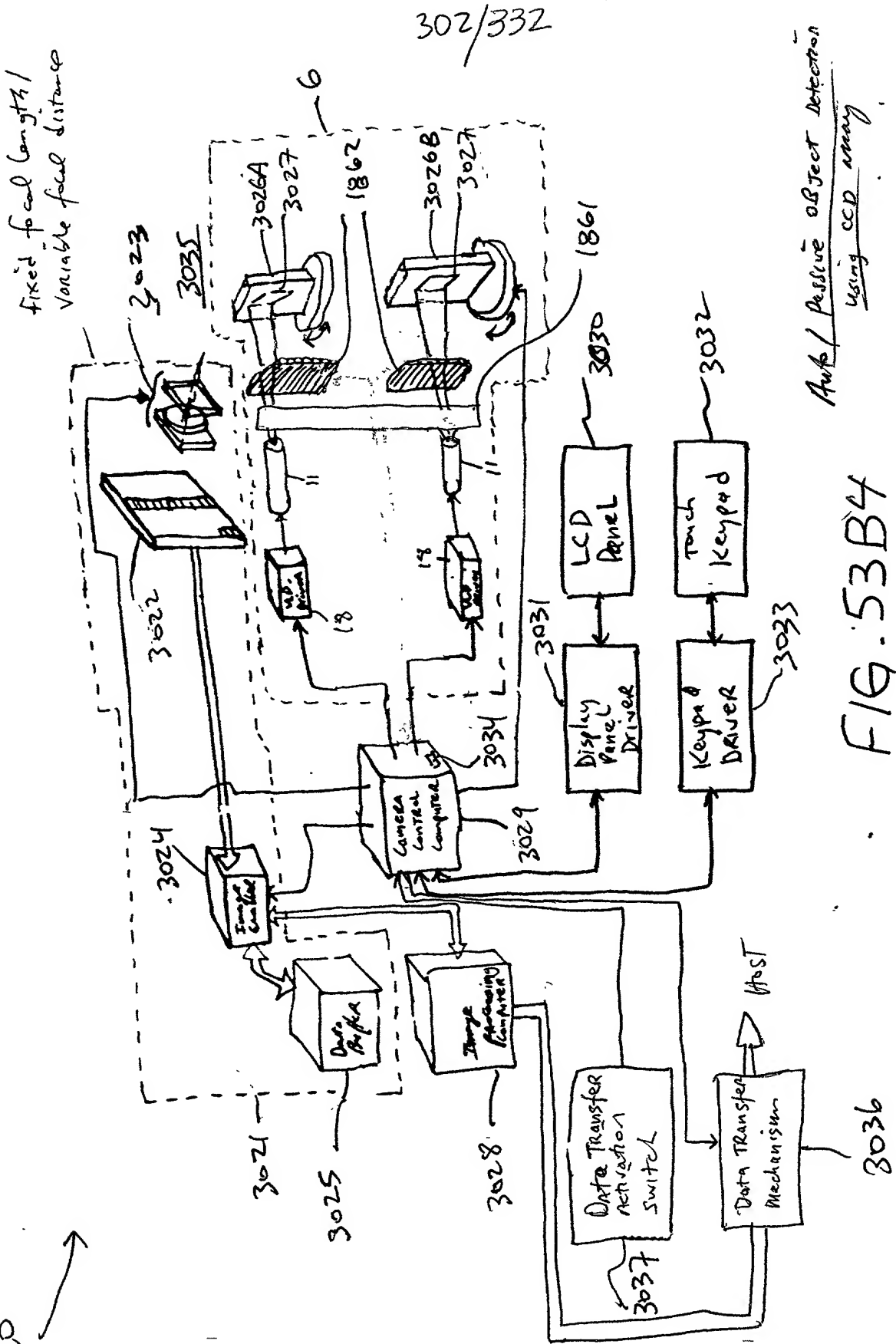


FIG. 53B3

3615

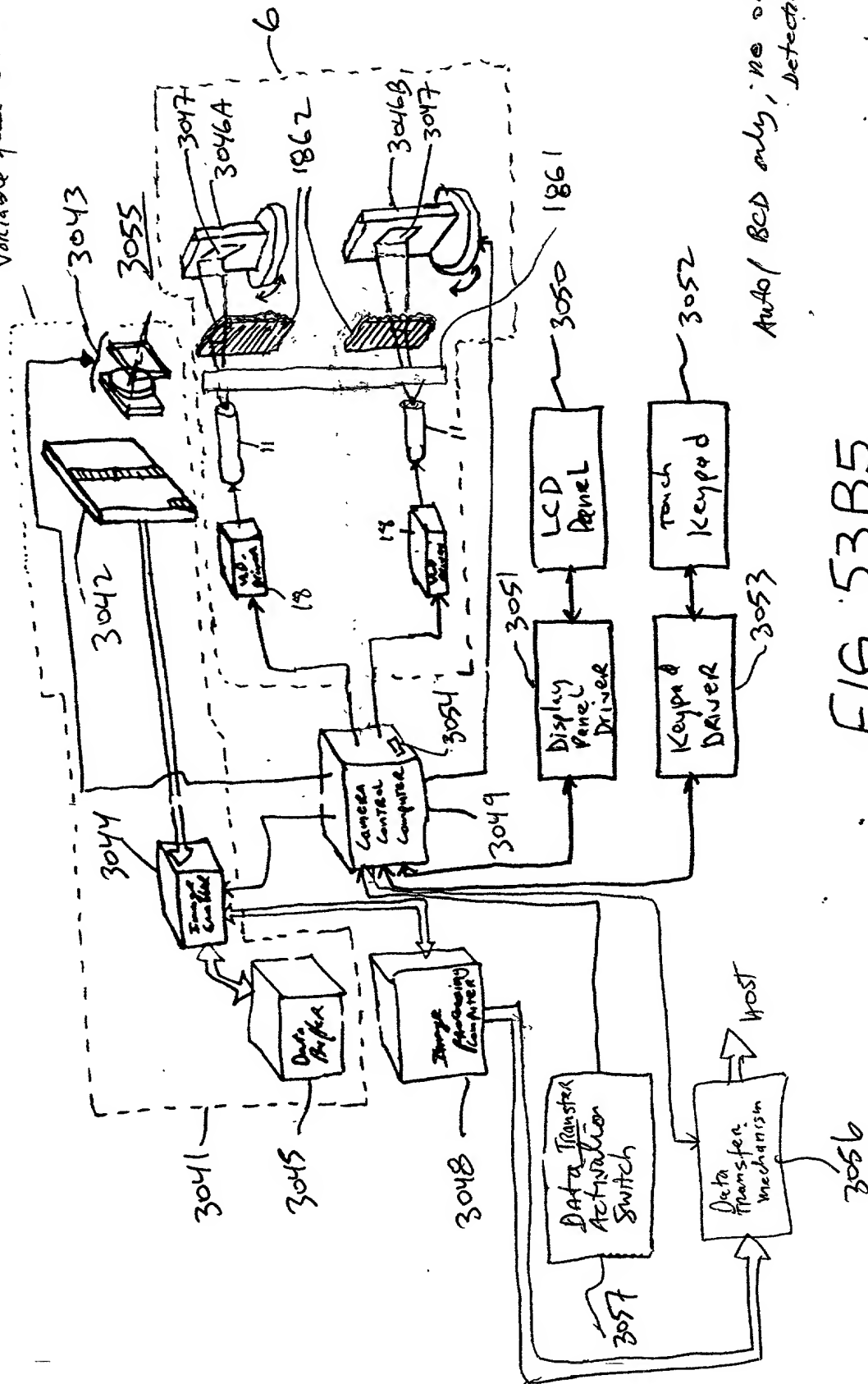


3020



← 3000

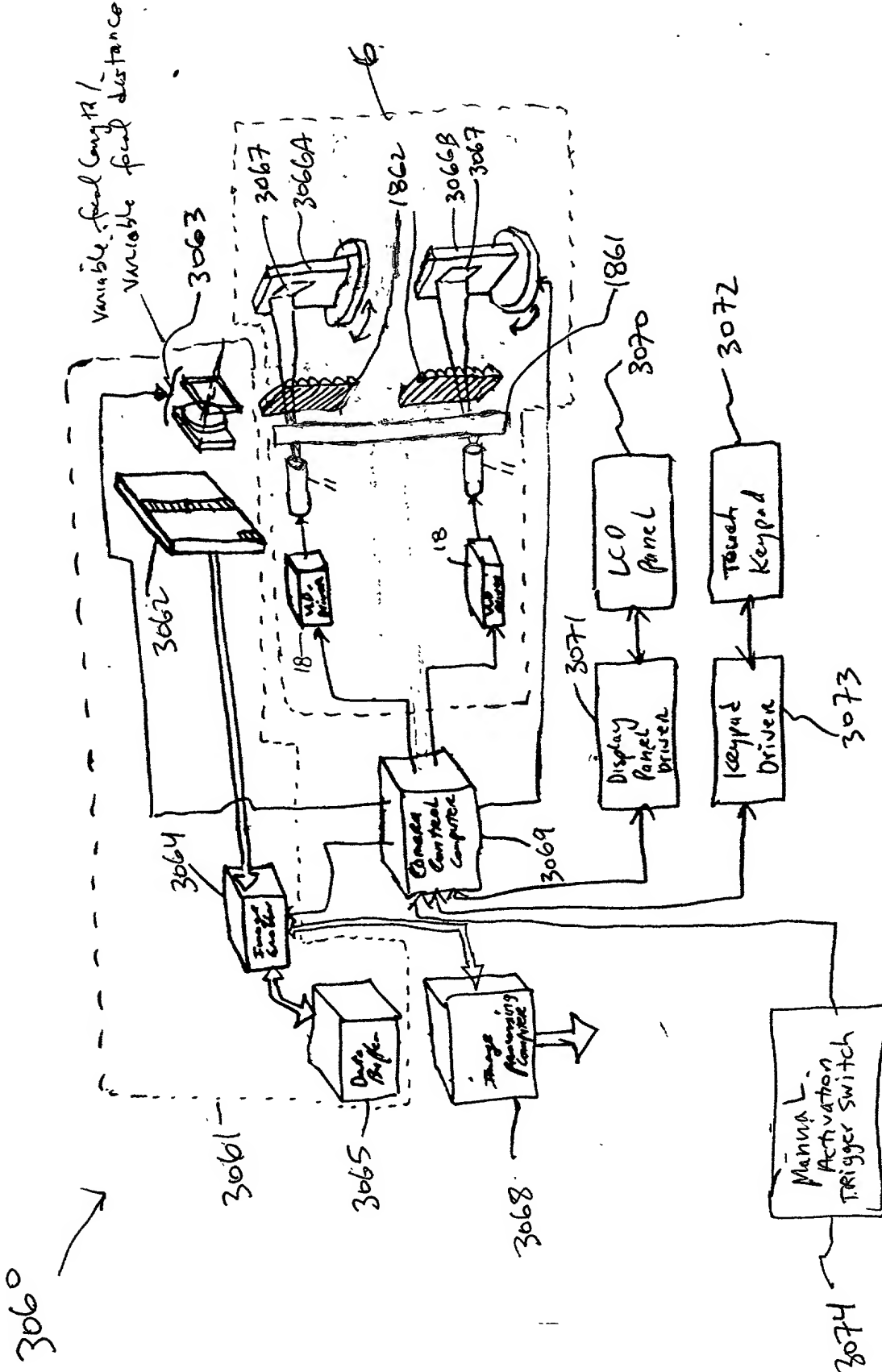
fixed focal length /  
variable focal distance



Auto / BCD only, no object detection

FIG. 53B5

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Manual

FIG. 53C1

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3080 →

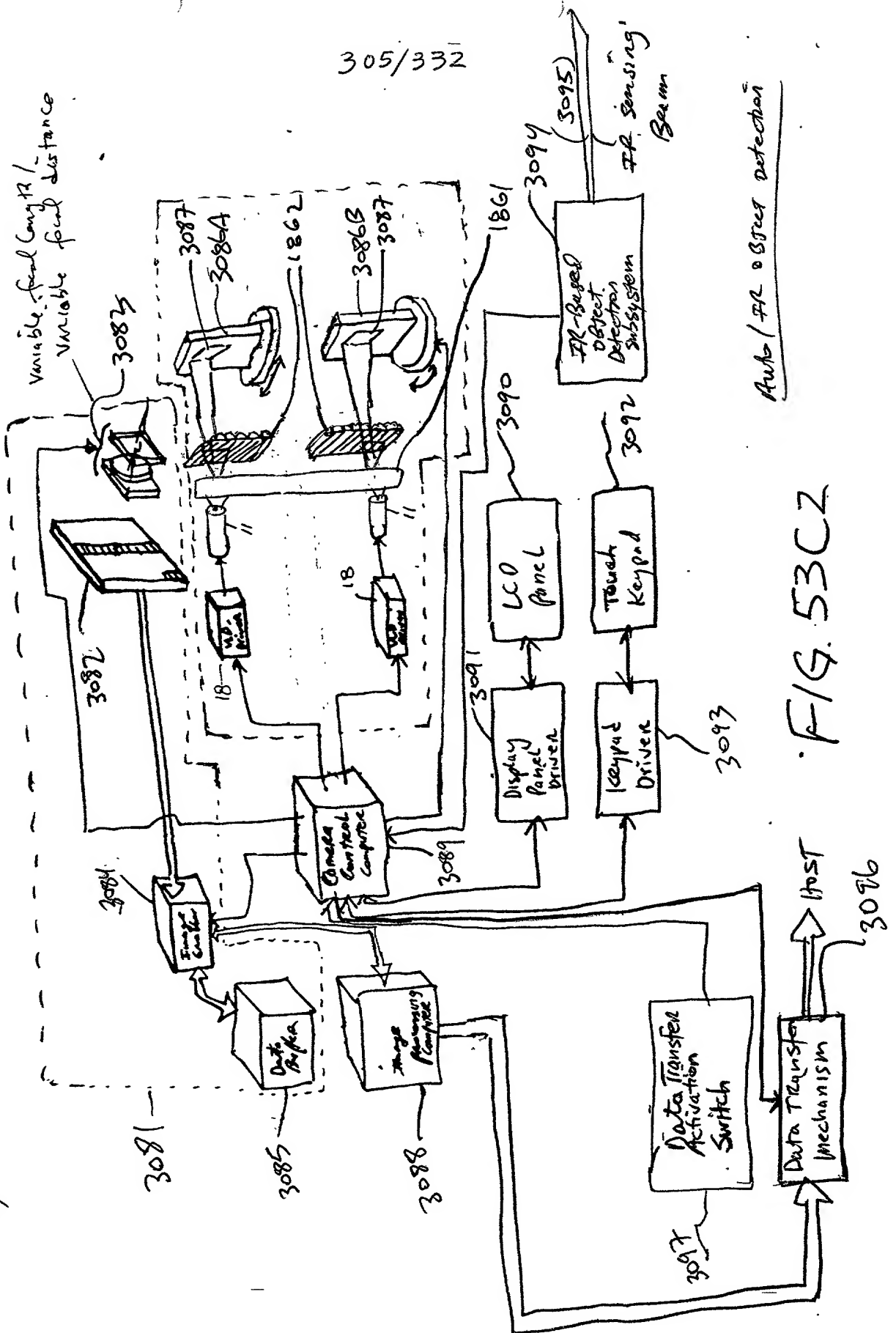


FIG. 53C2

Auto / IR object detection

4001

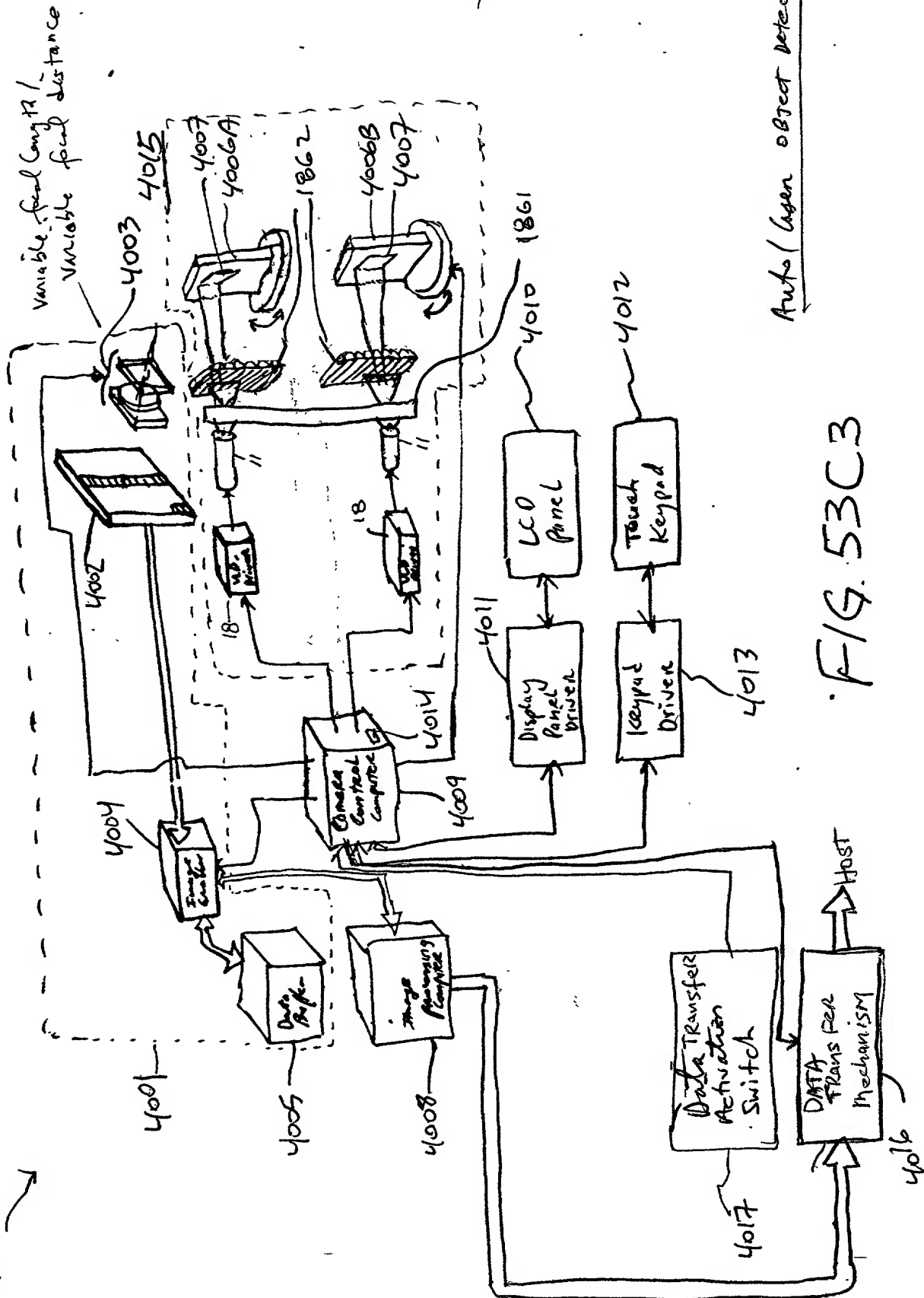
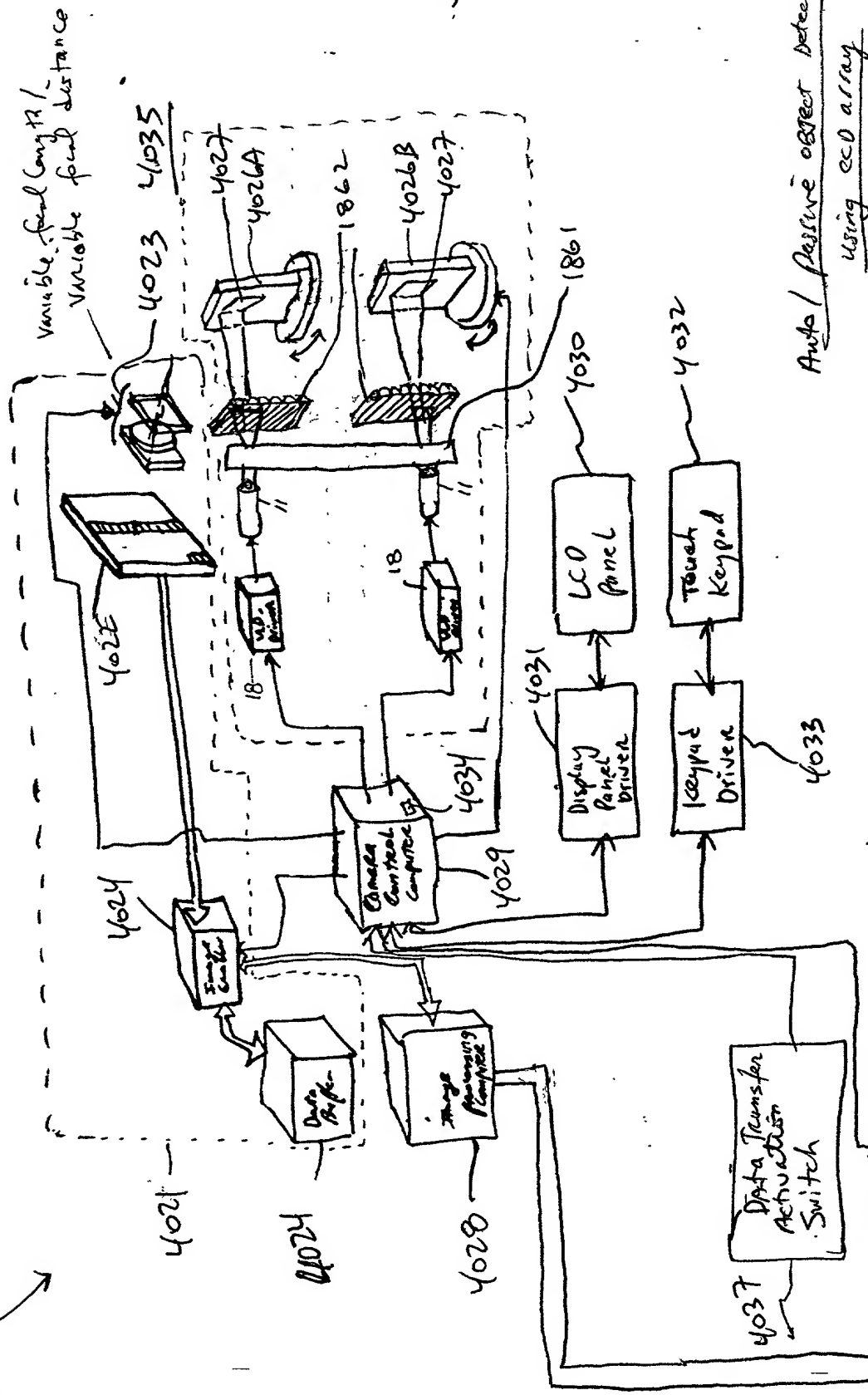


FIG. 53C3

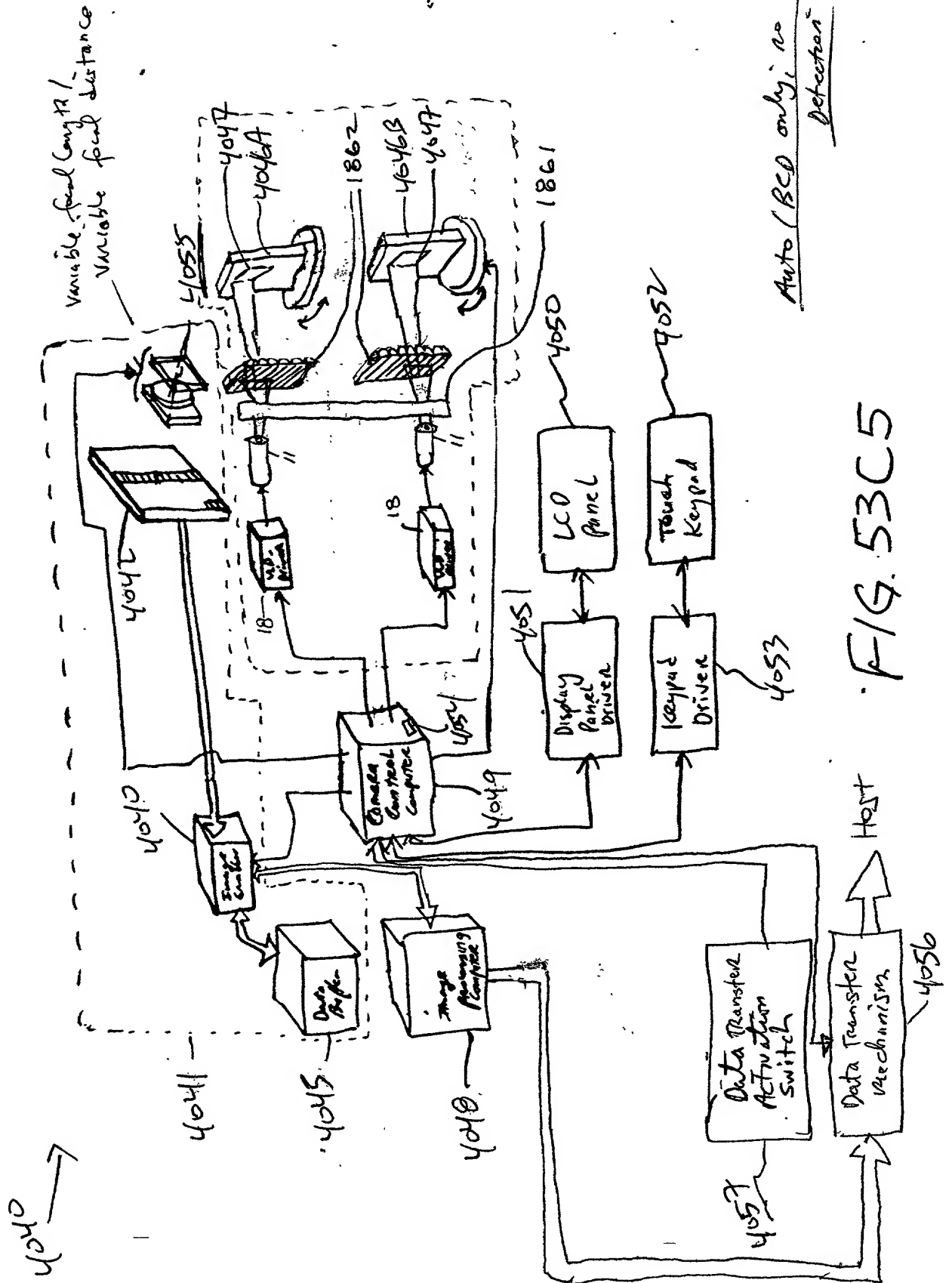
Auto / User object detection

4020



Auto / Passive object detection  
using CCD array

FIG. 53C4



Auto (BCD only) no object  
detection

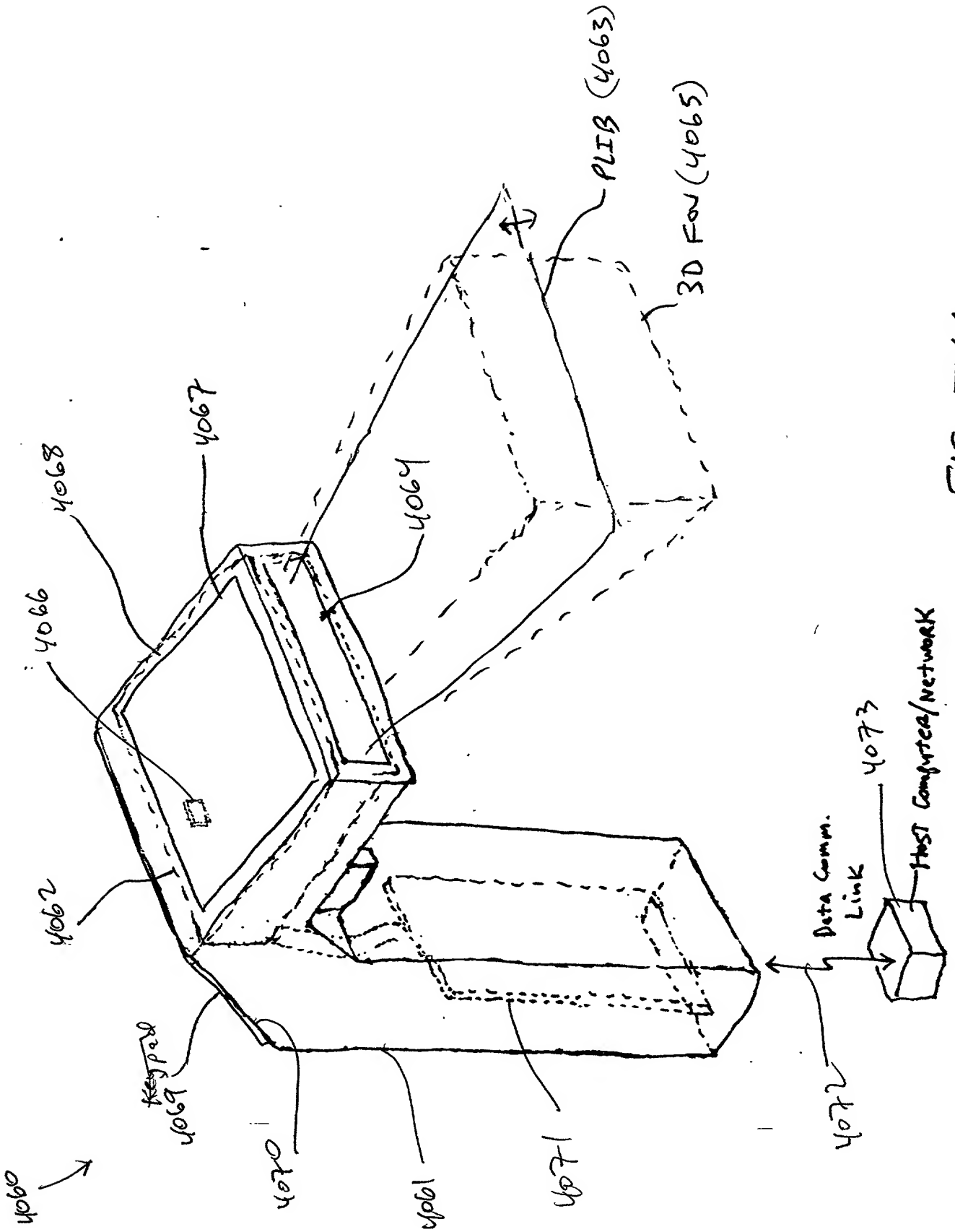
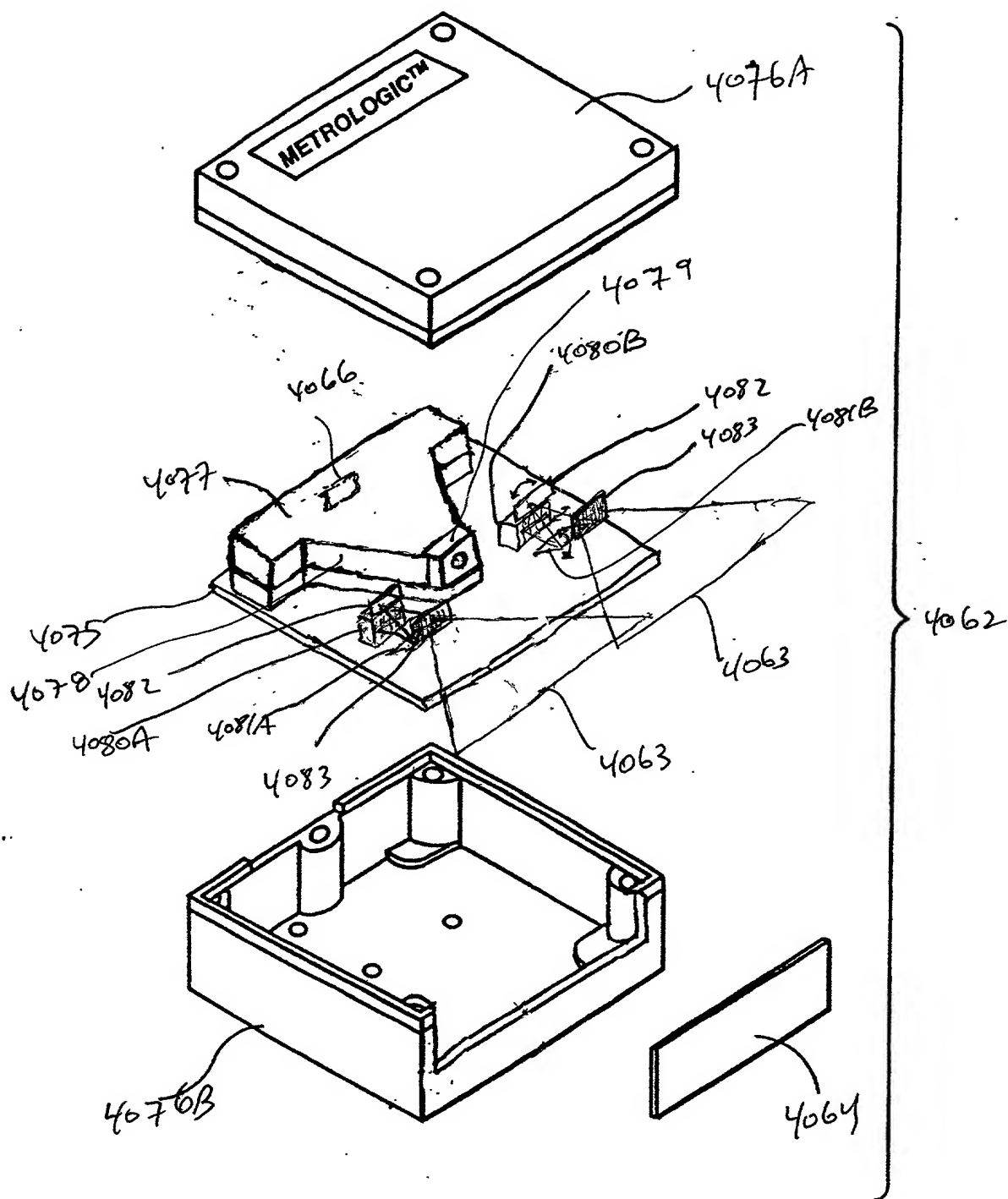


FIG. 54A





(dual mirrors)

Fig. 175A-5P1

2003/04/20

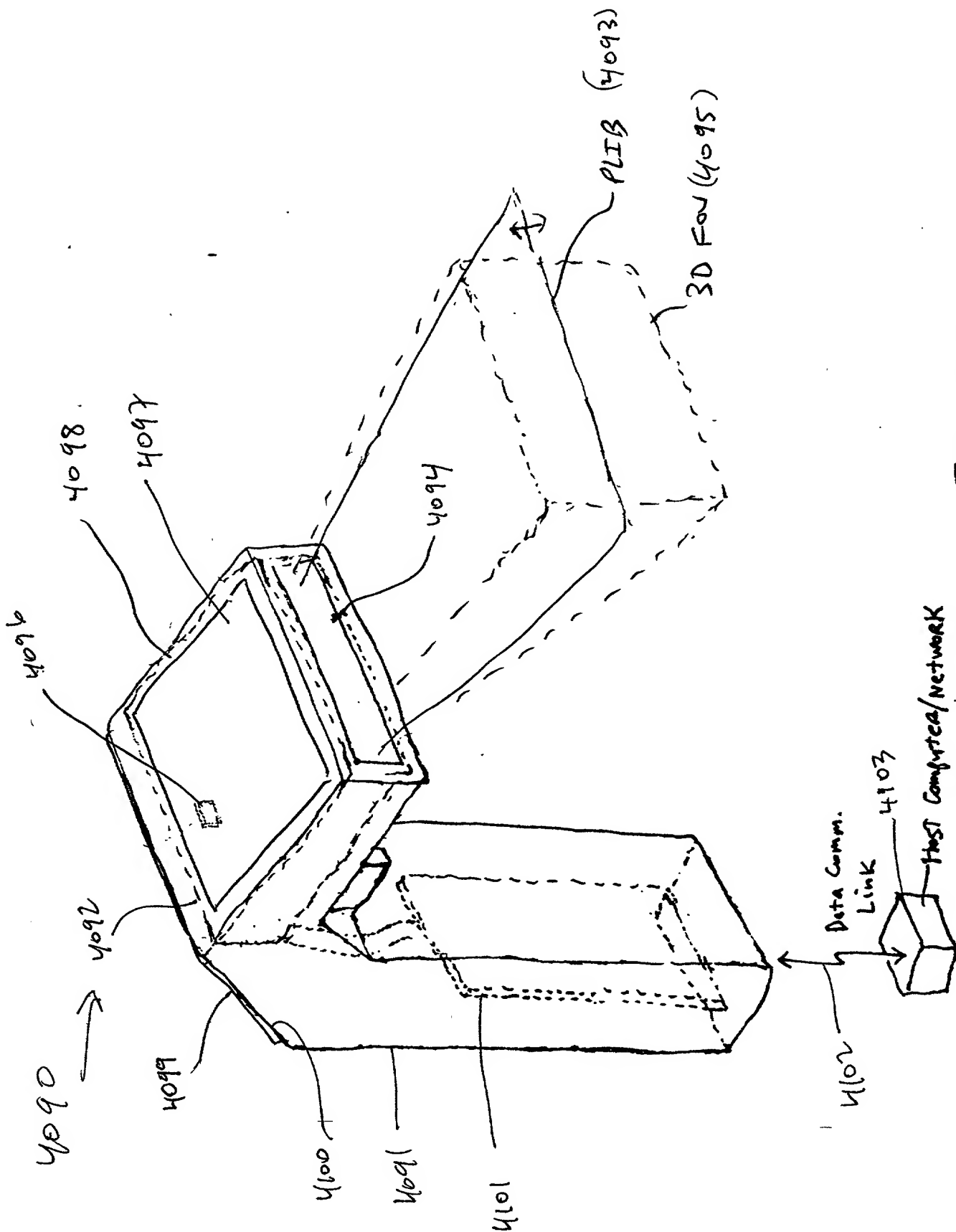


FIG. 55A

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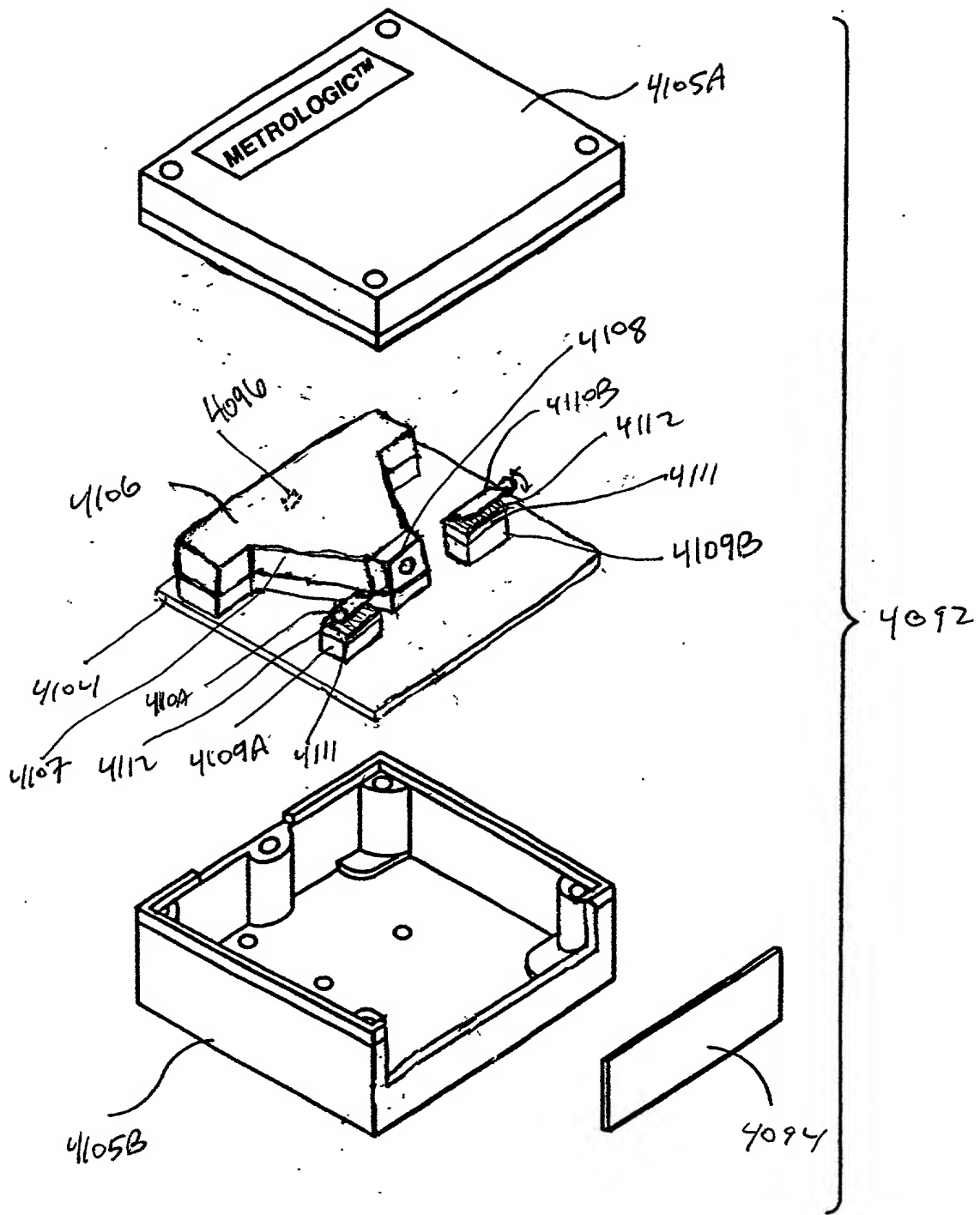


FIG. 55B

Brogg cell  
Figs 126A-6B

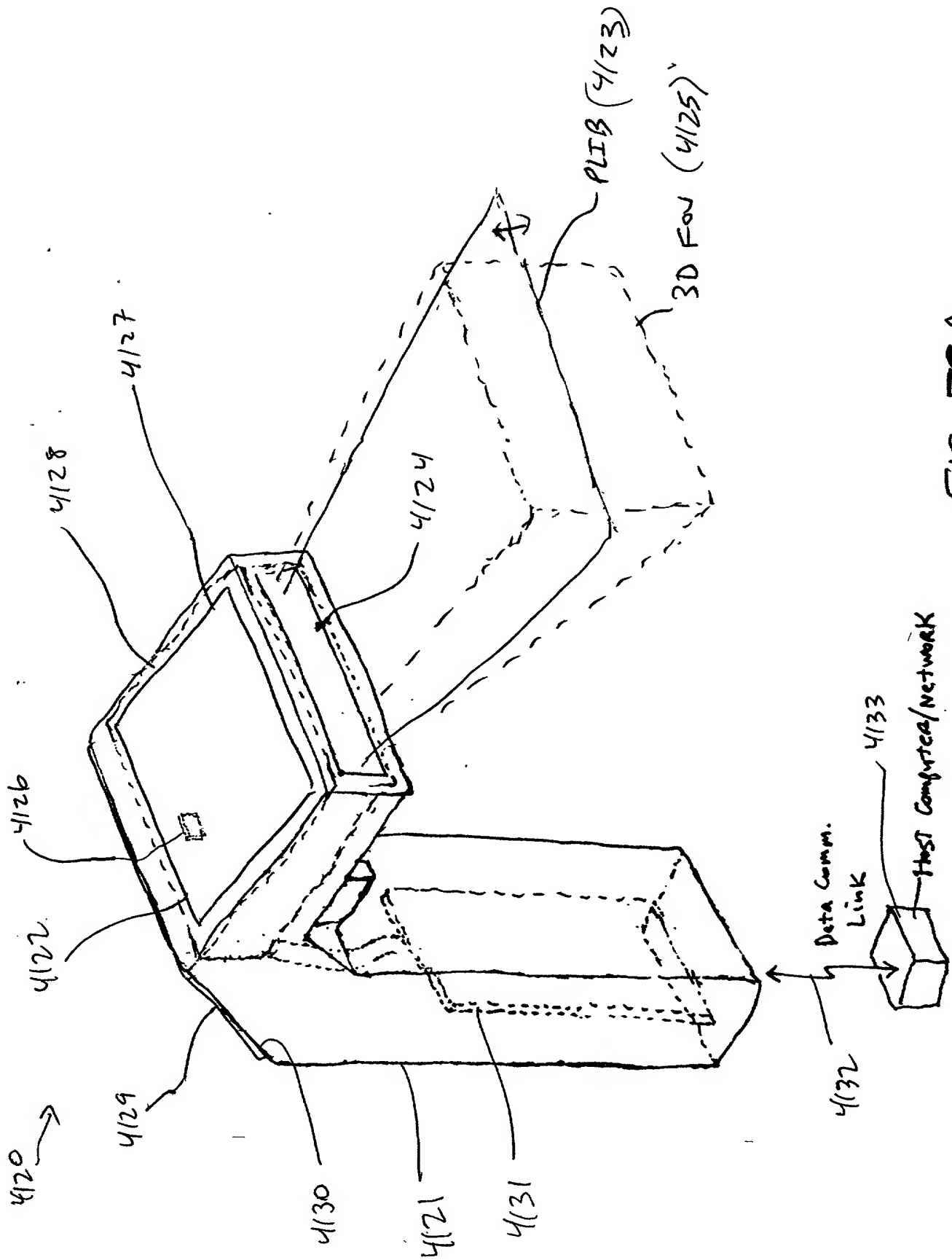


FIG. 56A

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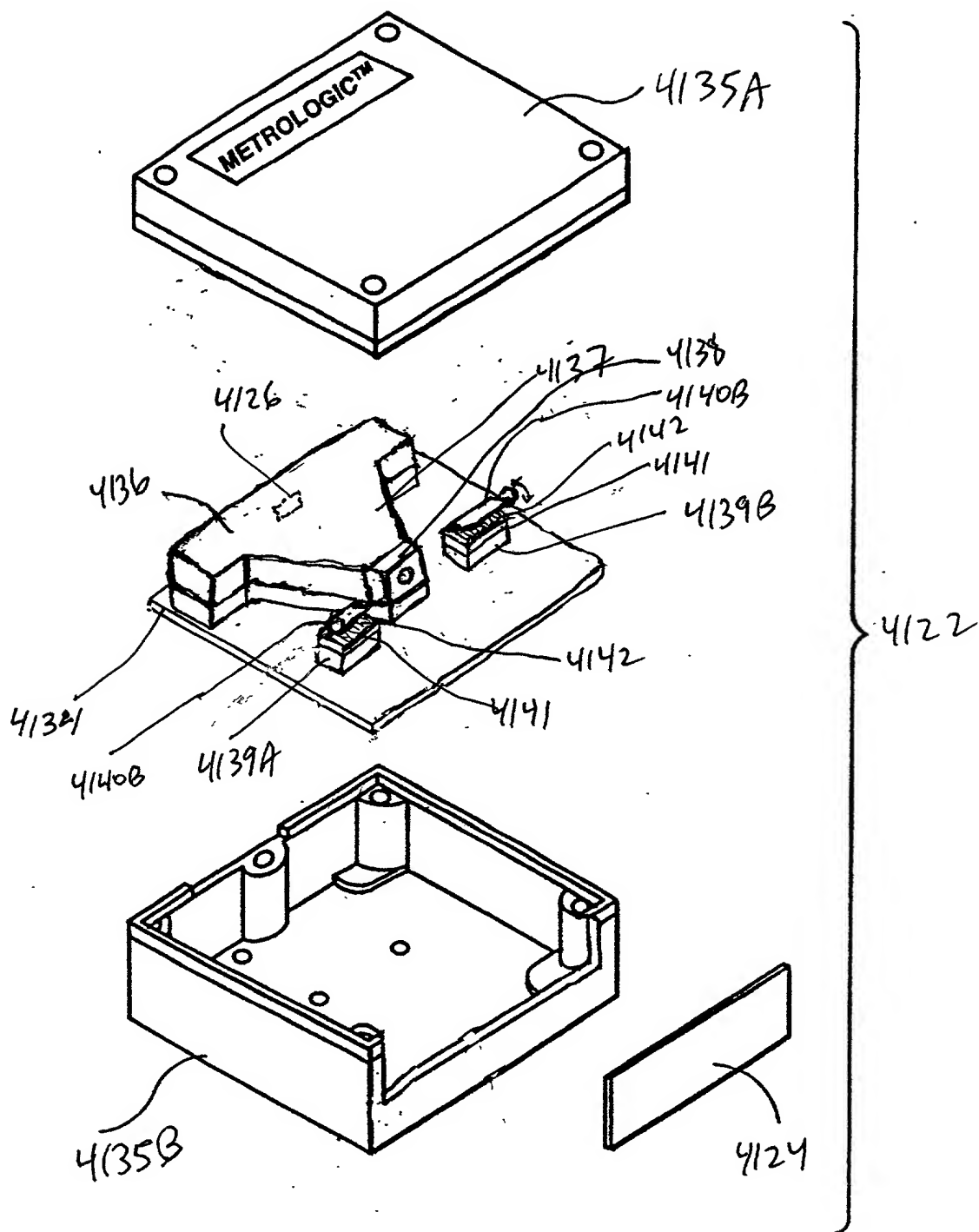


FIG. 56B

DM

Fig. 7A-7C

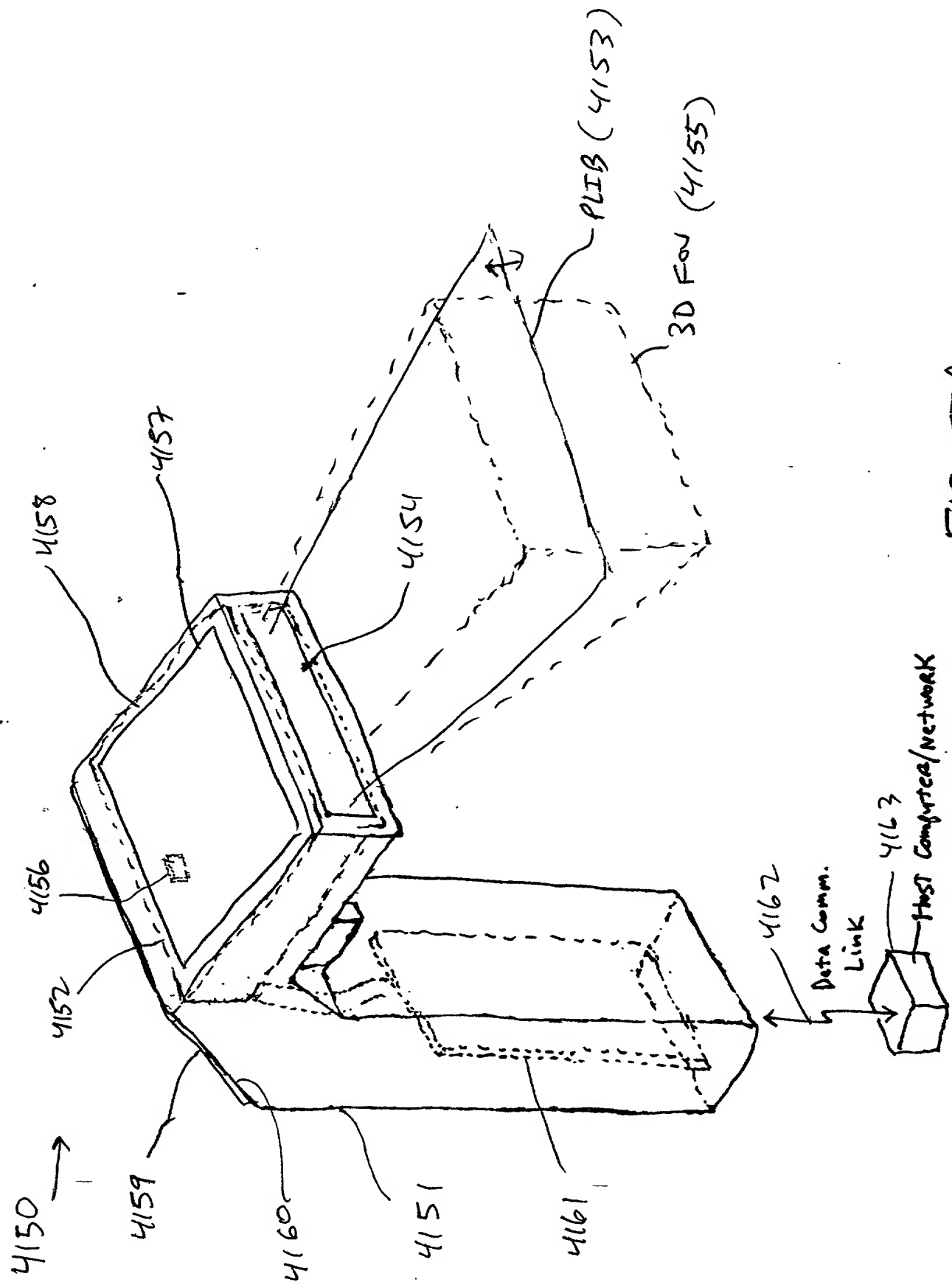


FIG. 57A

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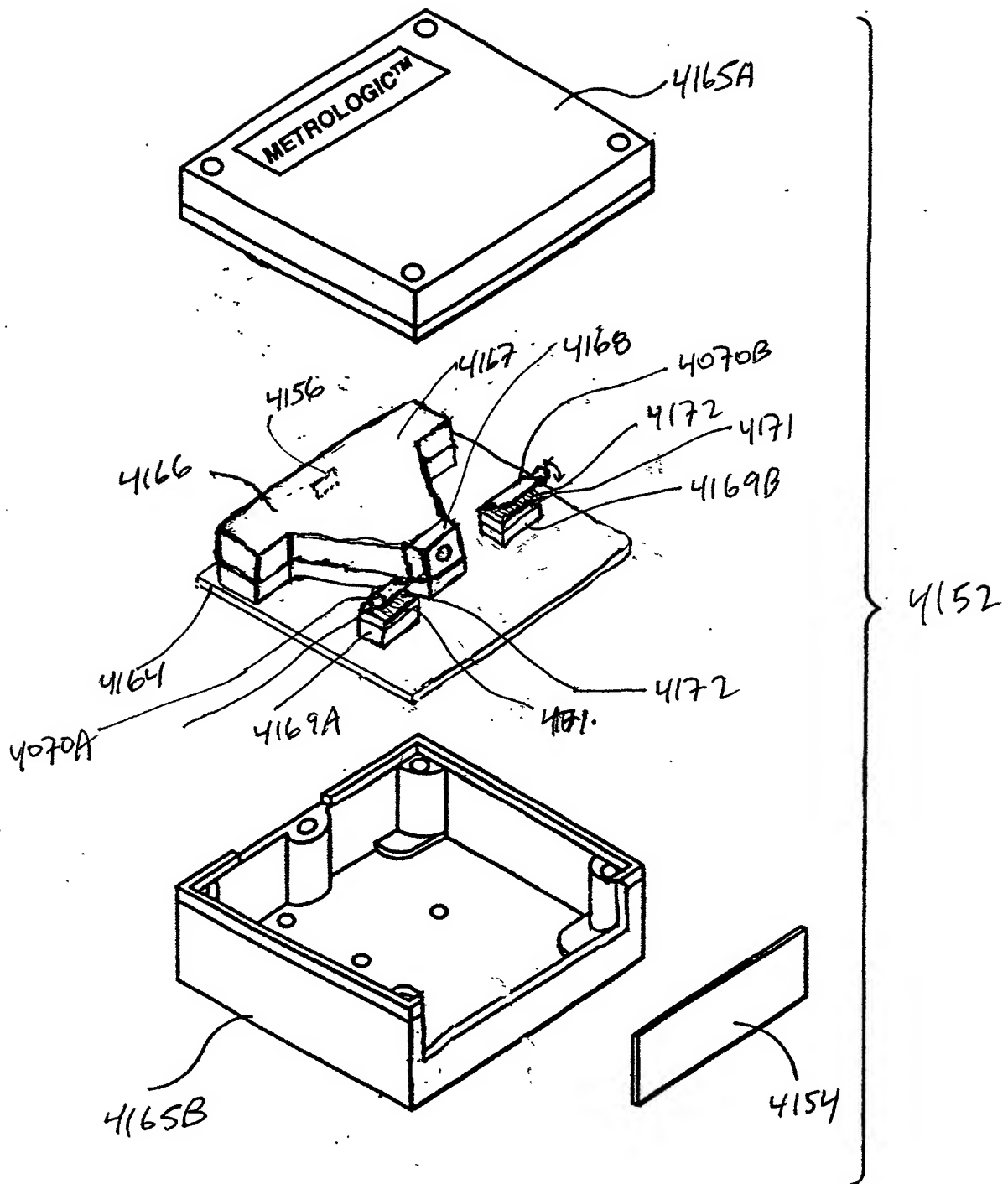


FIG. 57B

Phase only LCR  
PM panel

Fys 1F8F-86

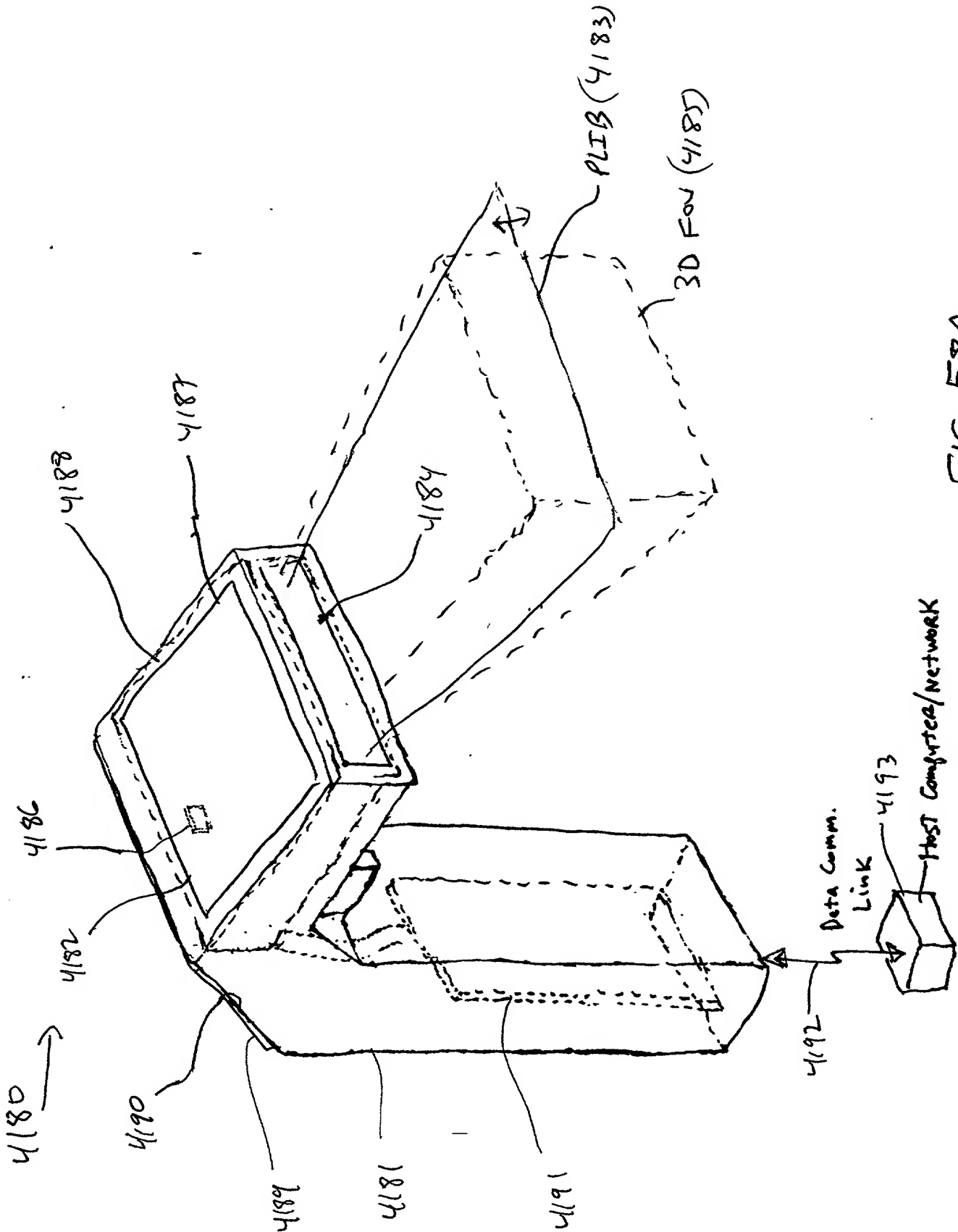


FIG. 58A



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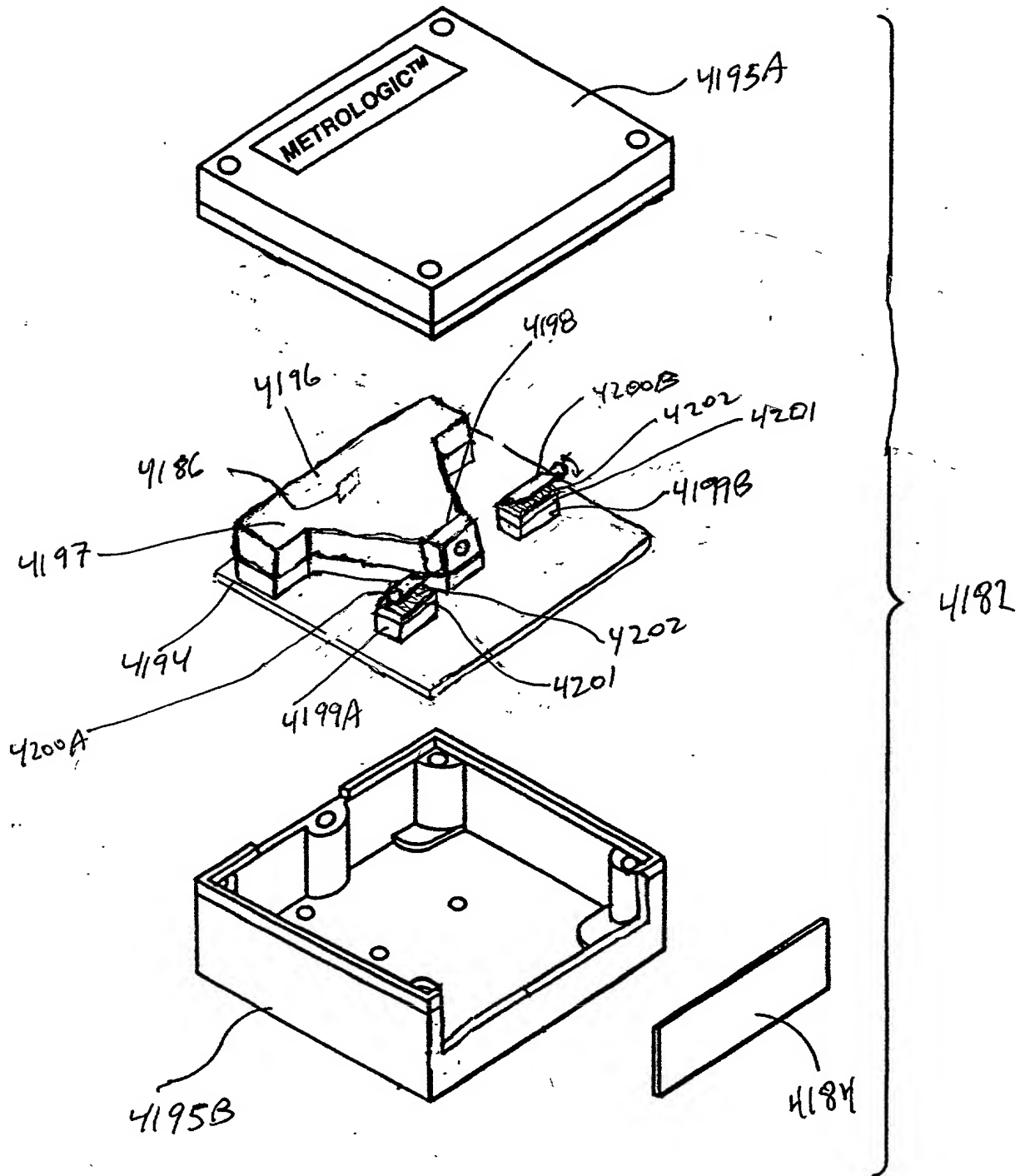


FIG. 58B

HS optical shutter

Fig. 1F14A-14B -

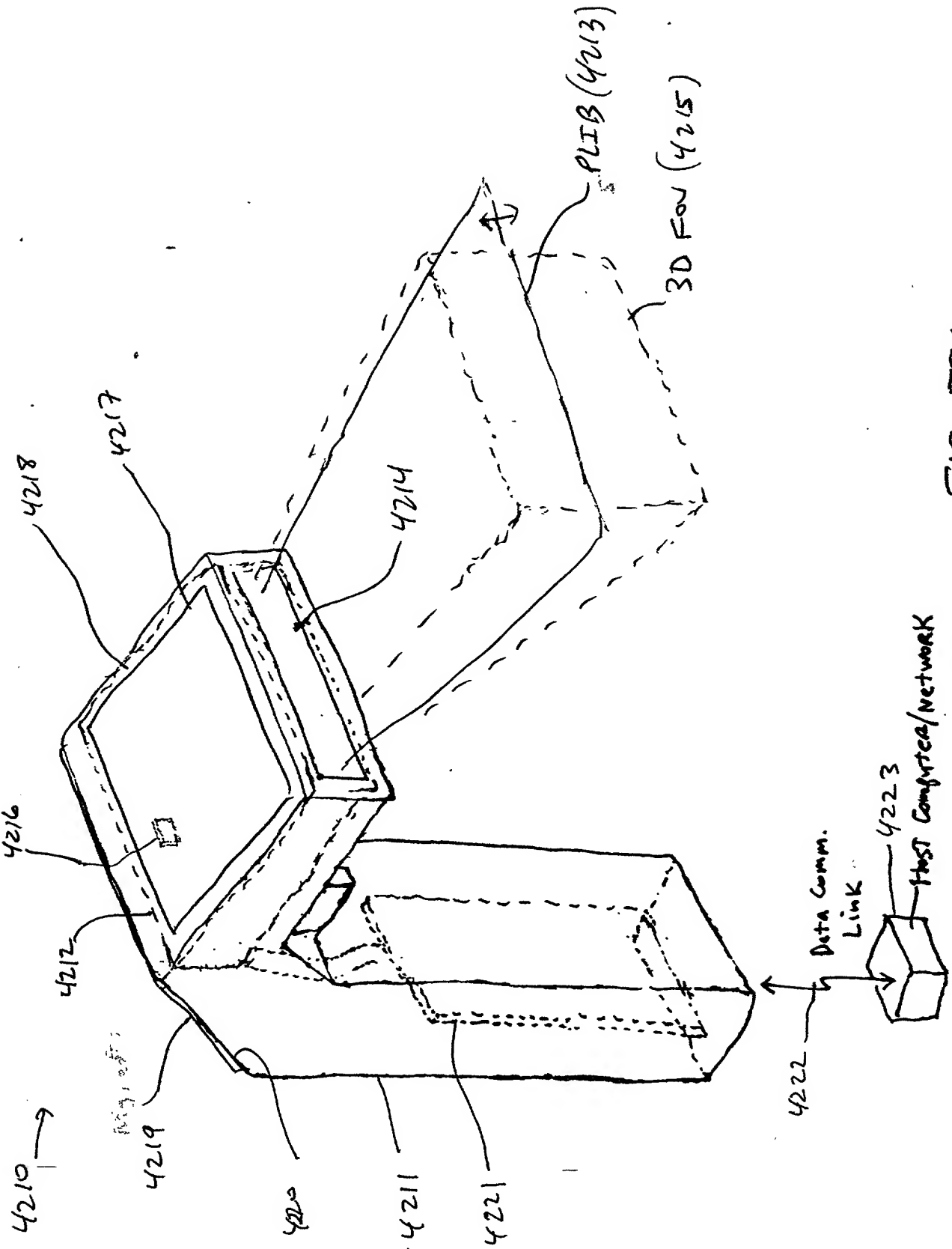


FIG. 59A

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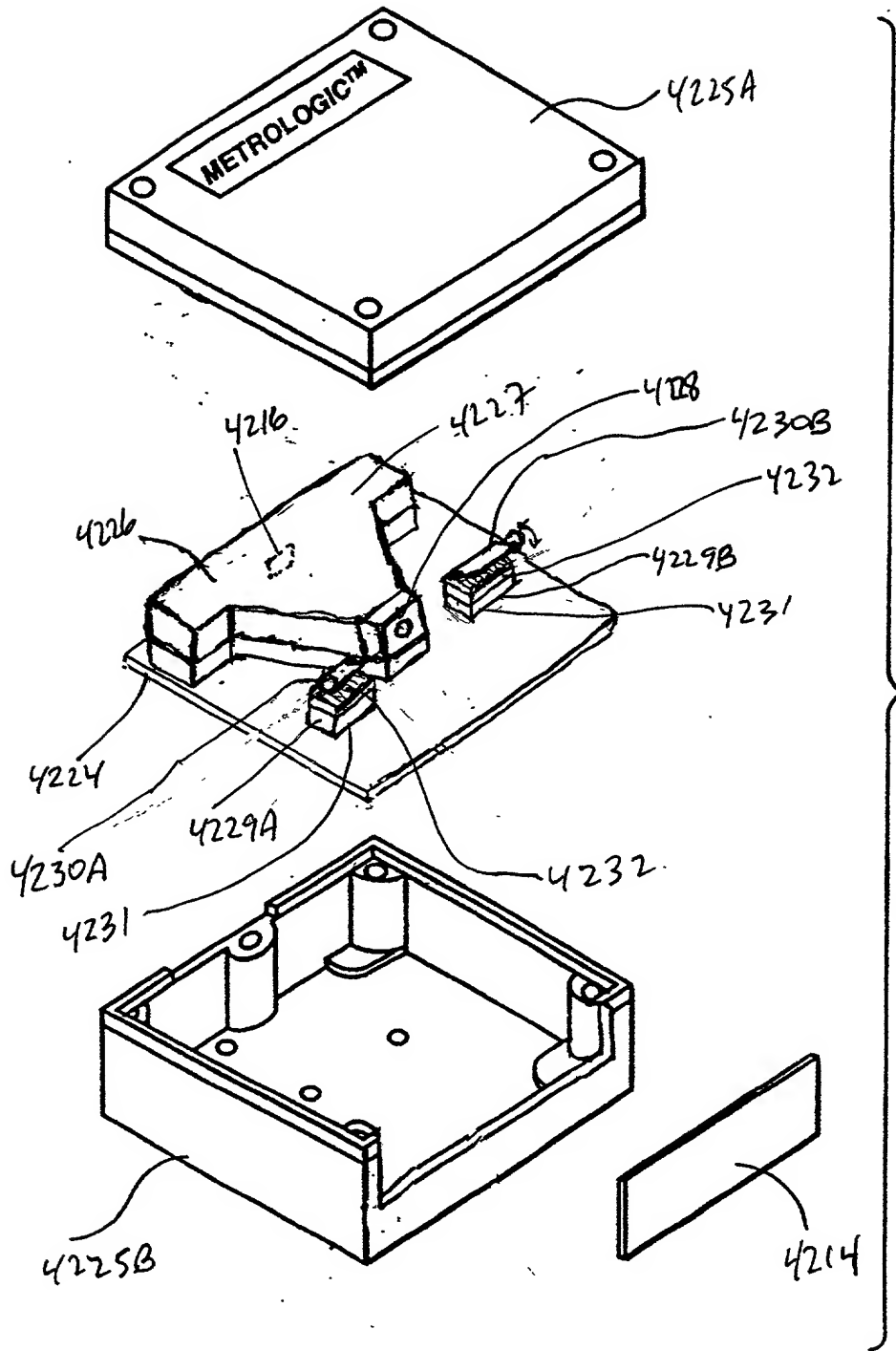


FIG. 59B

MLLP

Fig. 15A-15B



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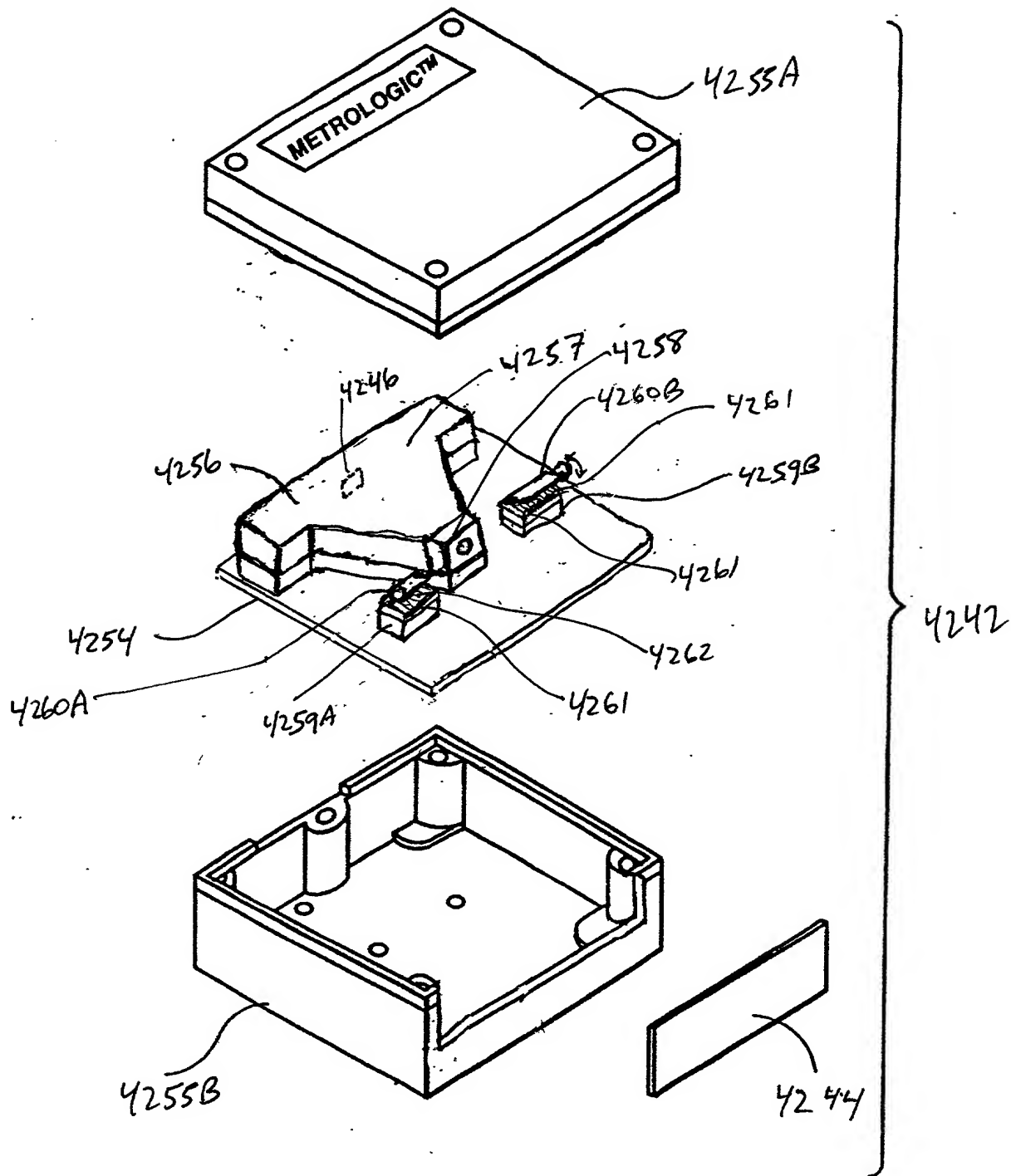


FIG. 60B

Bthalon (Tang. phase mod.)  
Fig. 1 I 7A-17B

4270



4296

4292

4298

4297

4299

4300

4271

4301

4294

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PLIB (4293)

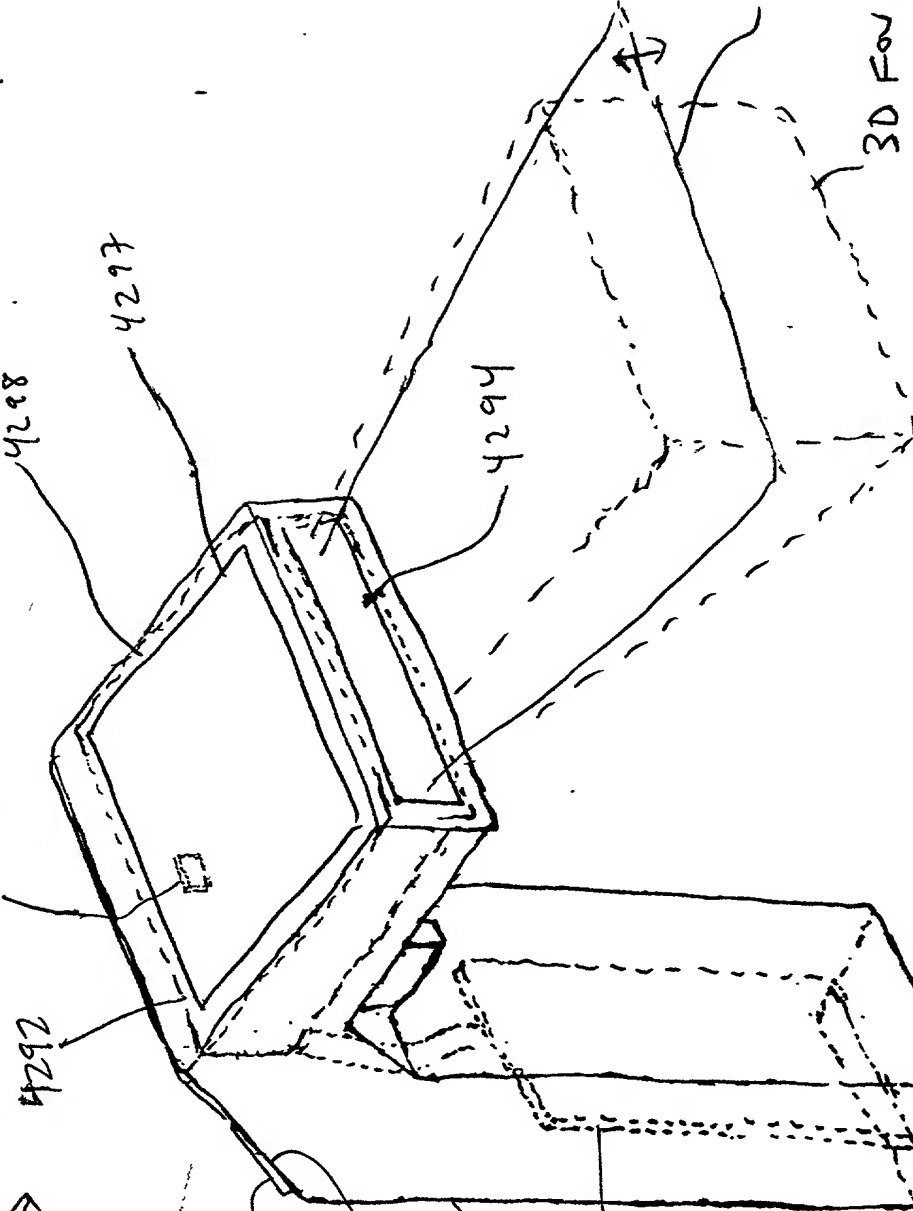
3D Fov (4295)

4302 Data Comm.  
Link

4303

Host Computer/Network

FIG. 61A



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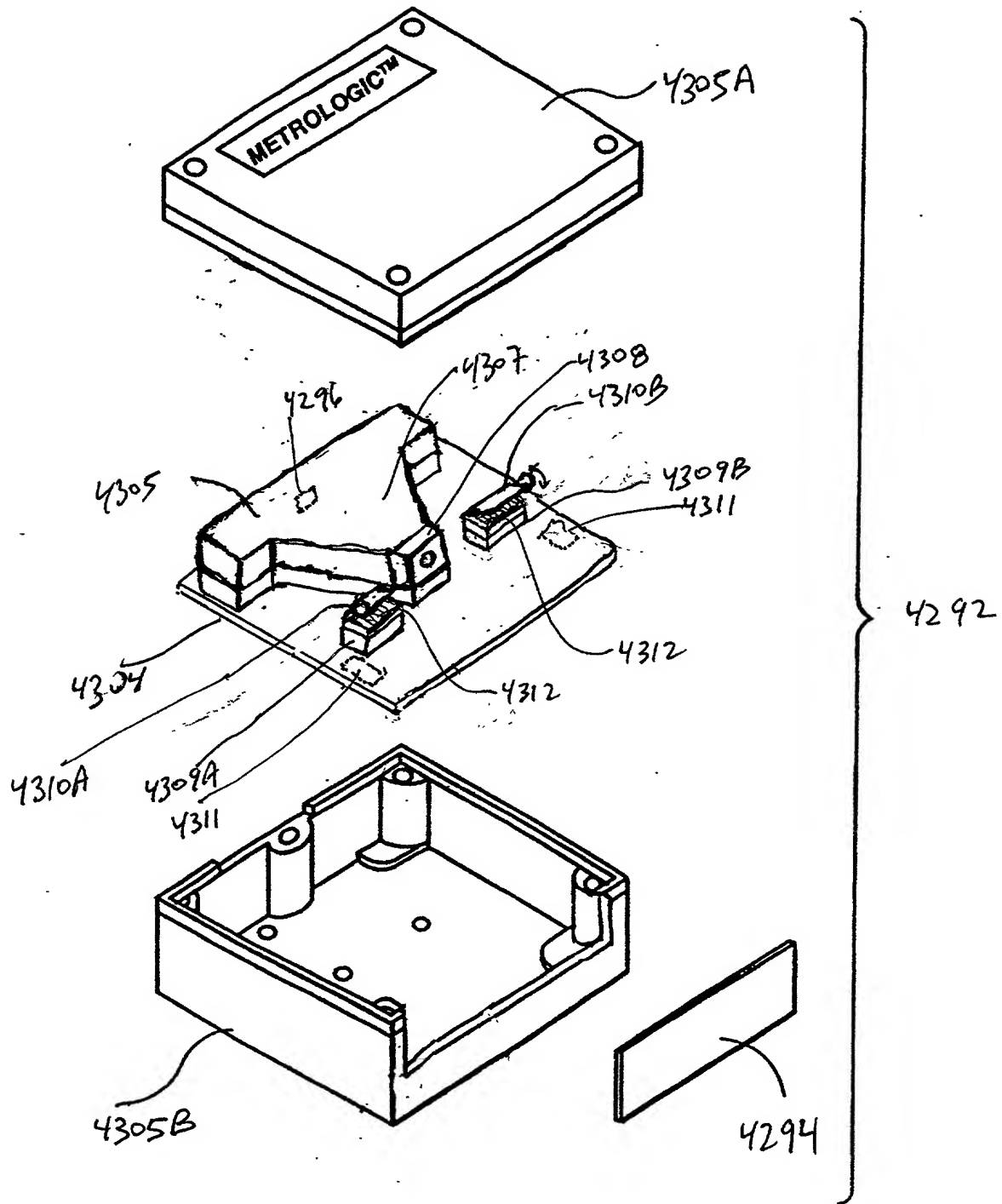


FIG. 61B

mod. hopping

Fig. 1A-19B

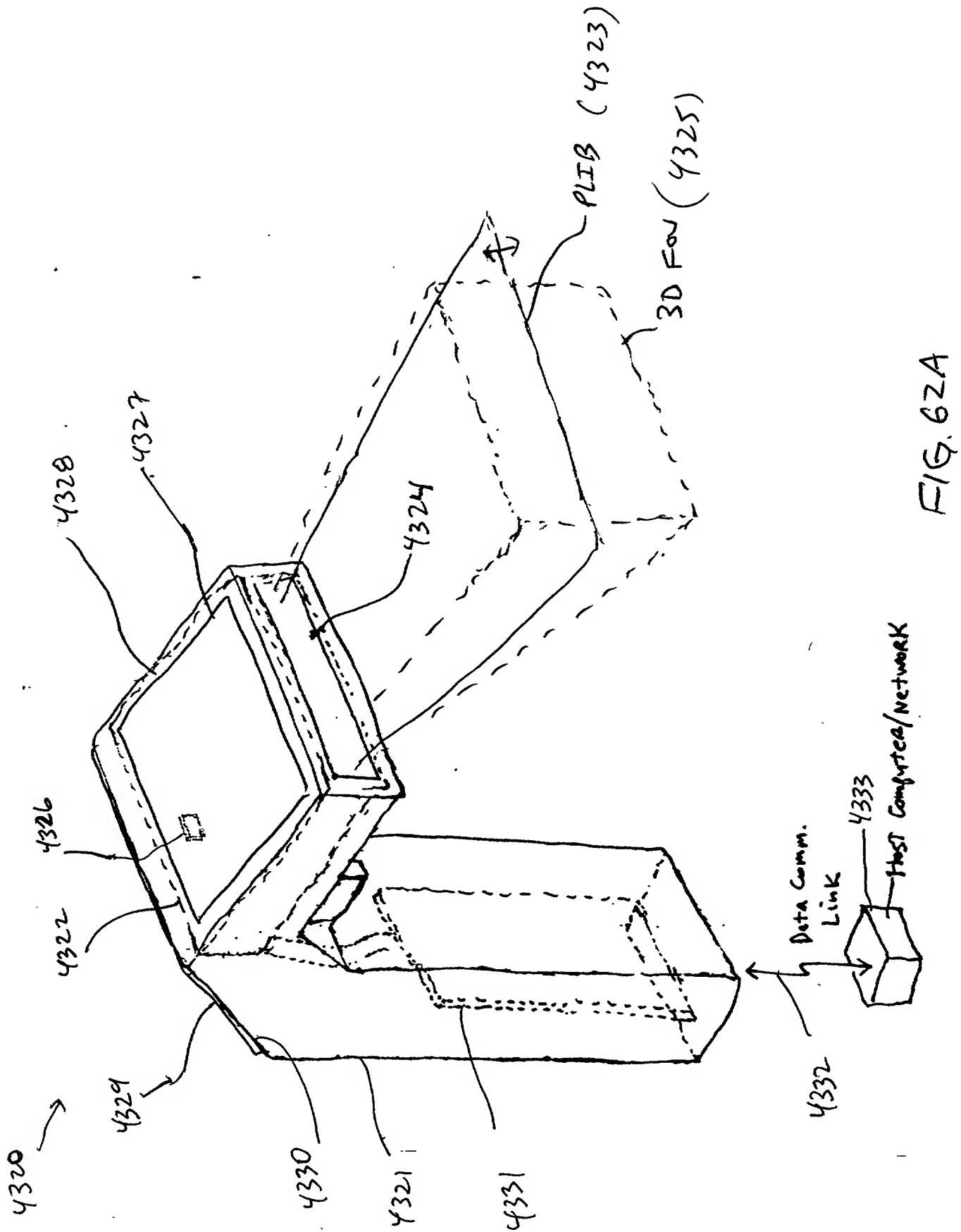


FIG. 62A



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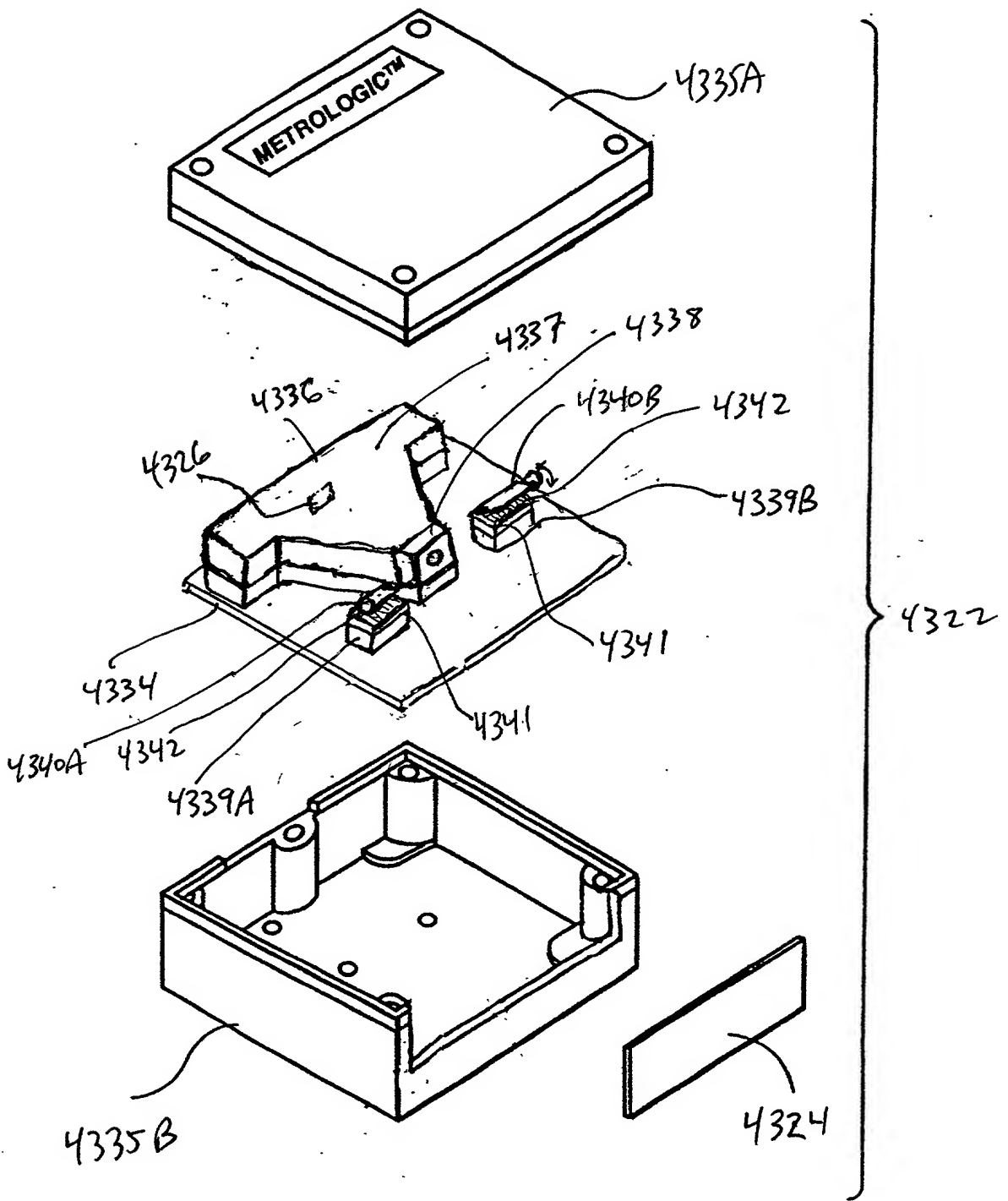


FIG. 62B

measuring  
spatial intensity  
mod. panels

Fig. 1F21A-21D

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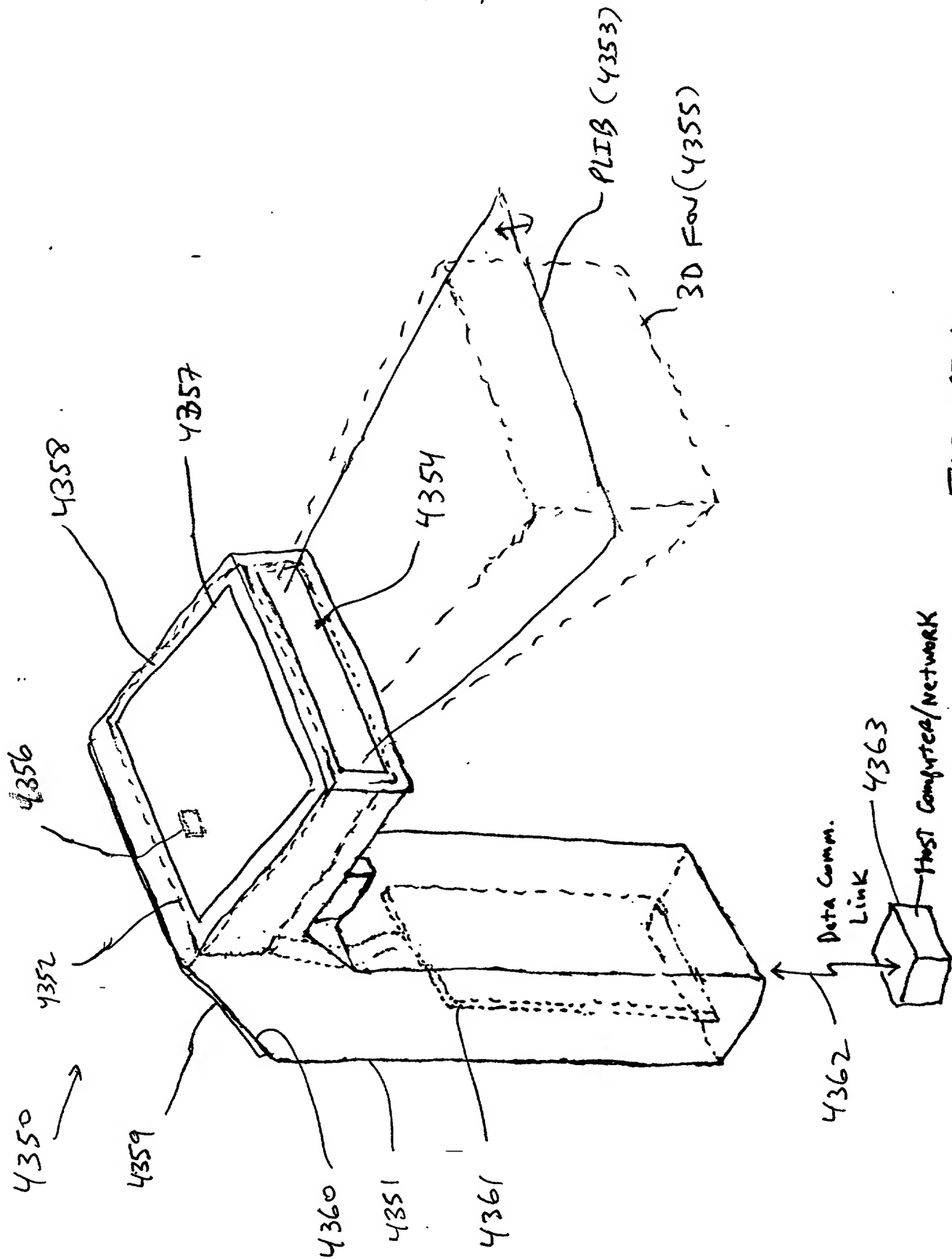


FIG. 63A

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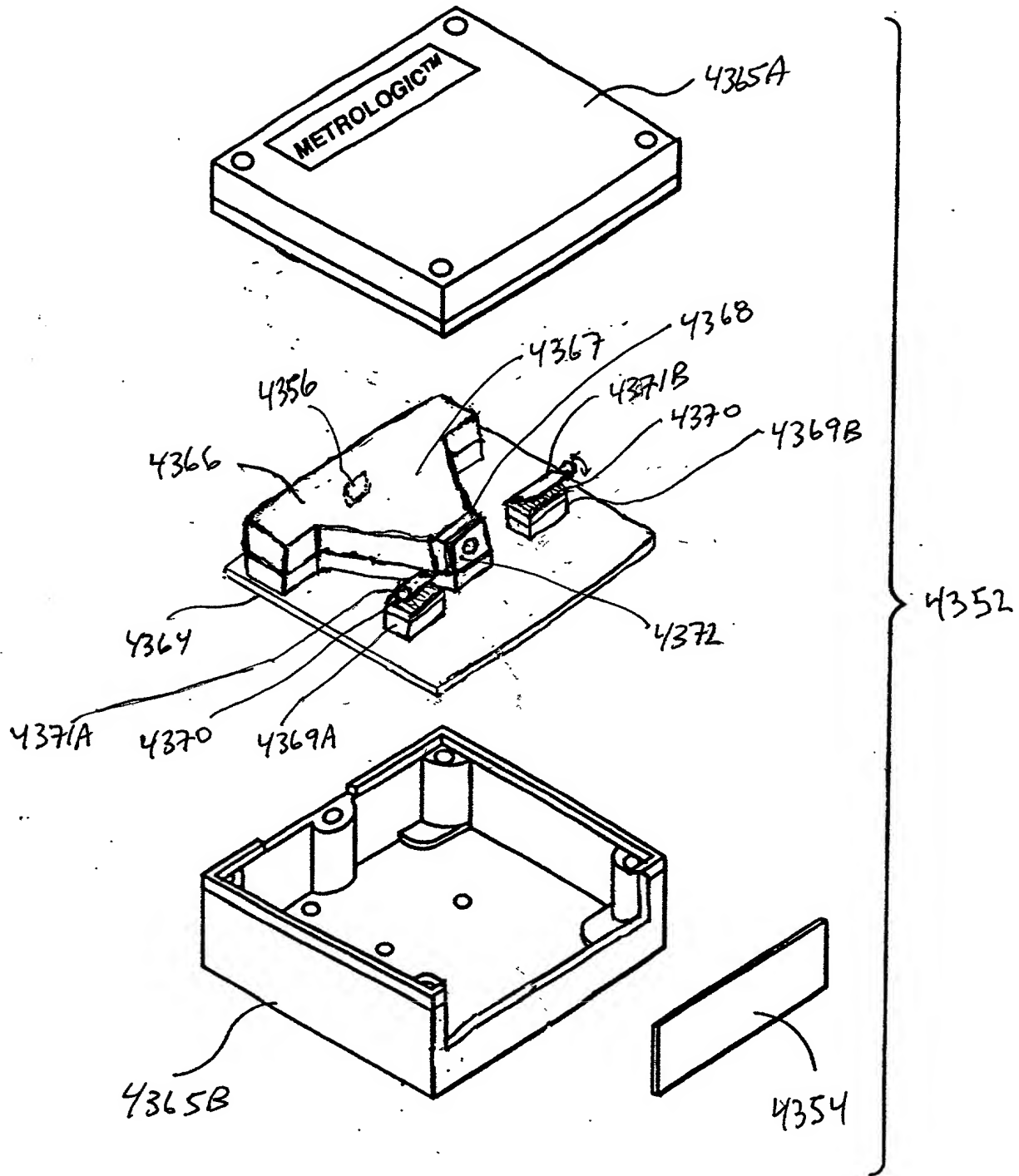


FIG. 63B

ED of  
mechanical part of Iris

Fig 1<sup>F</sup>  
23A - 23B

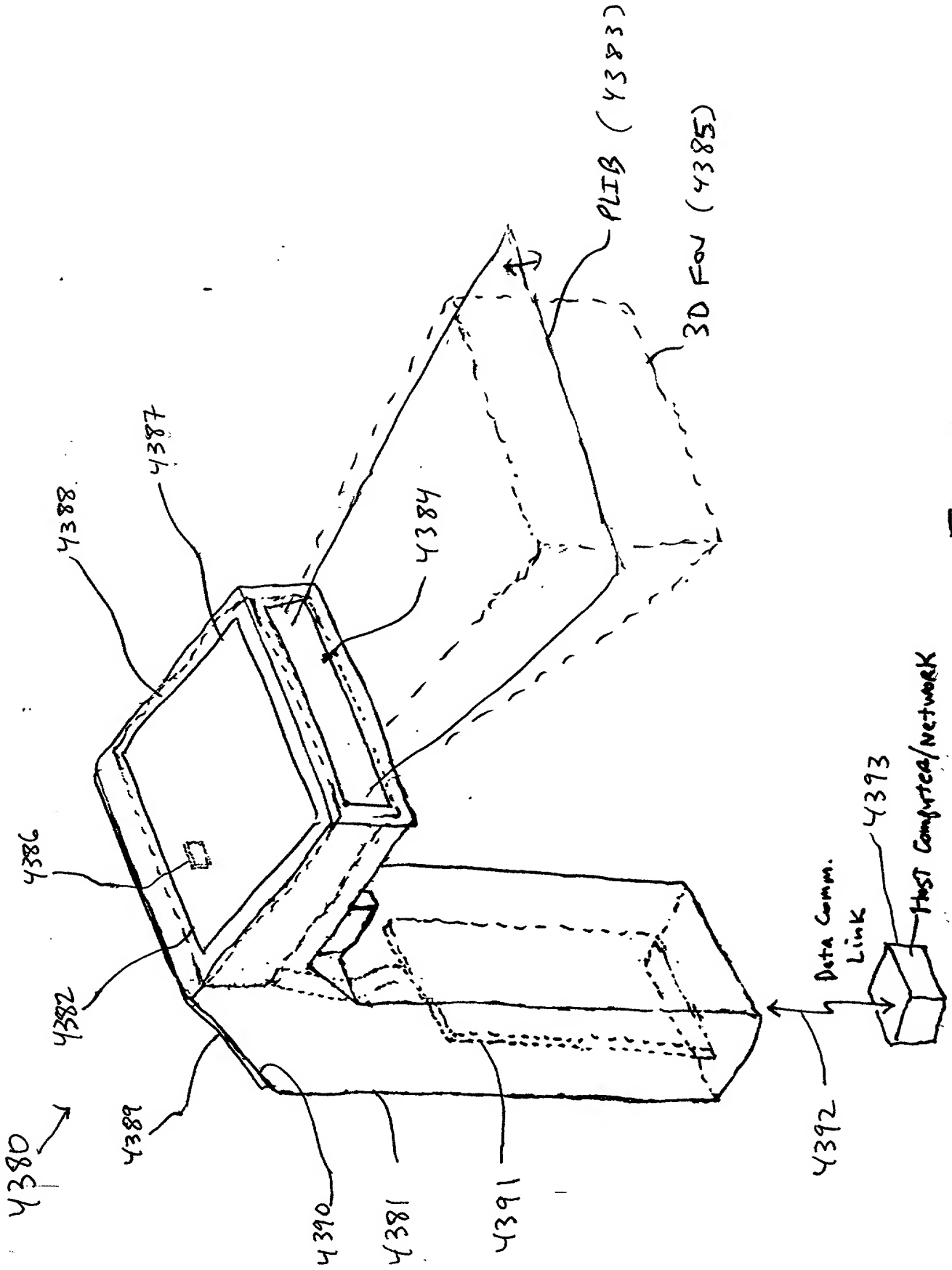


FIG. 64A

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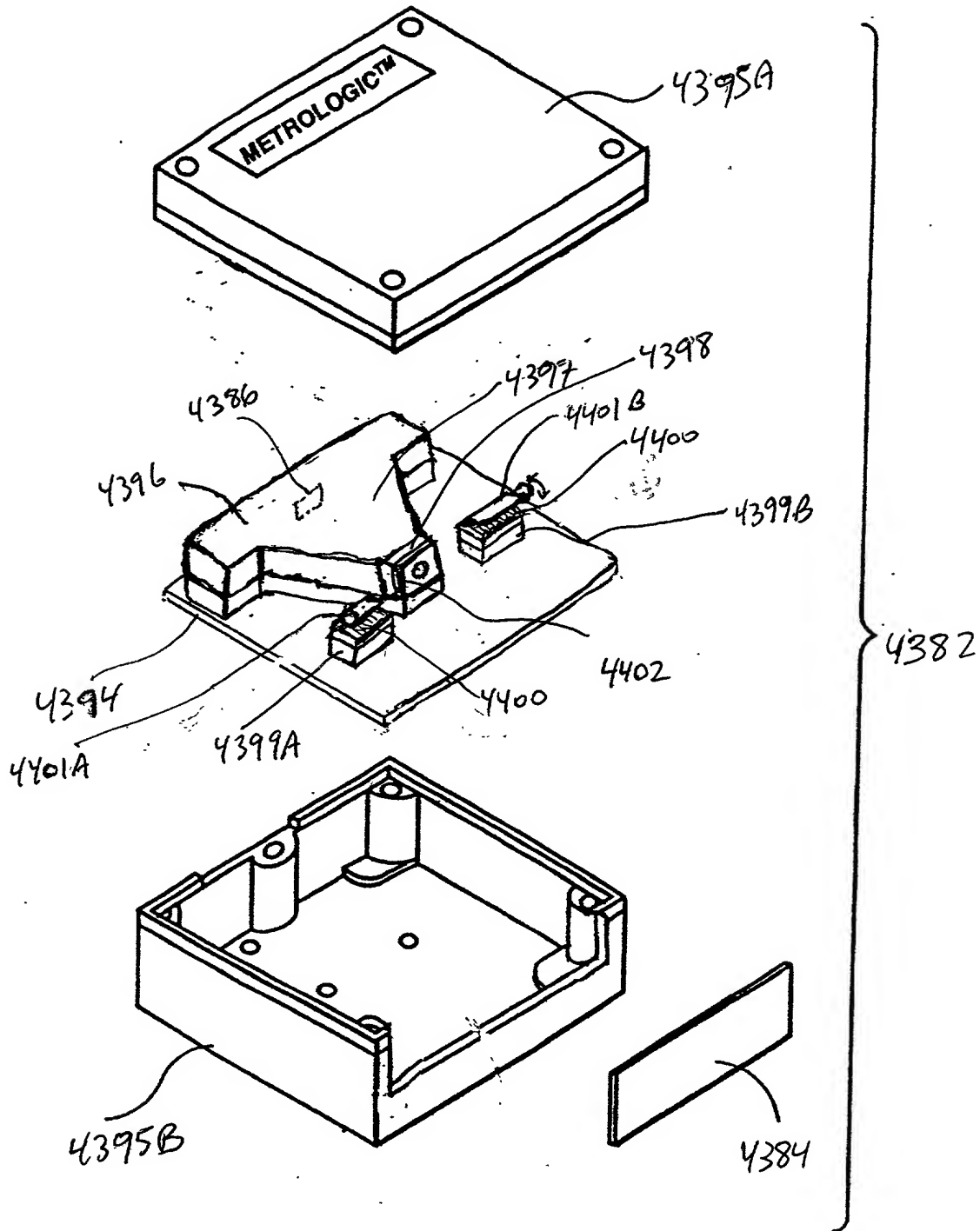


FIG. 64B

\* E-optical  
Shutter Before  
EP Lens  
Fig. 1E24A

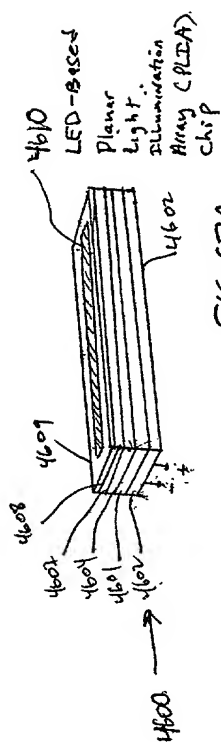


FIG. 67A

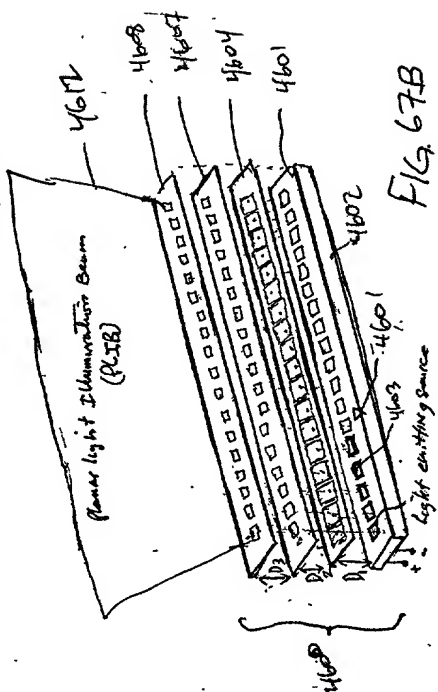


Fig. 67B

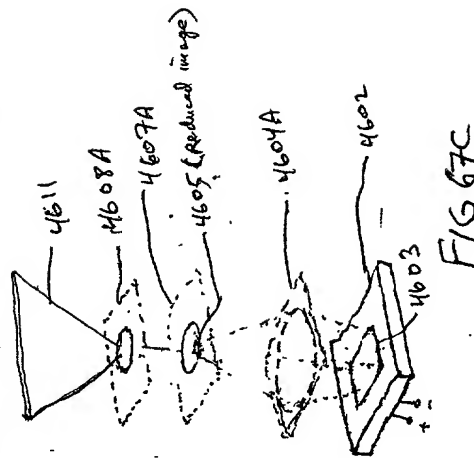
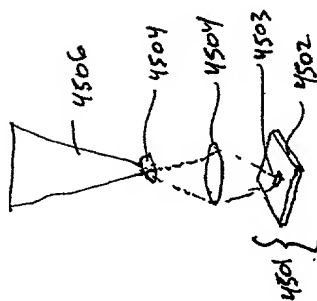


FIG 67C



F16. 65B

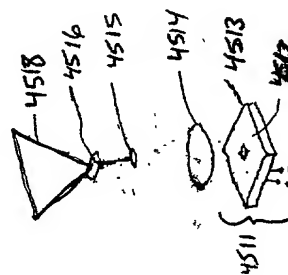


FIG. 66B

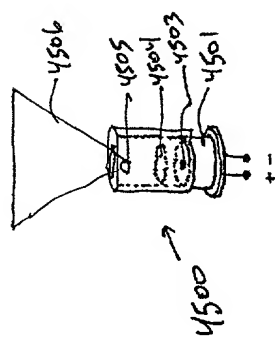


FIG. 65A

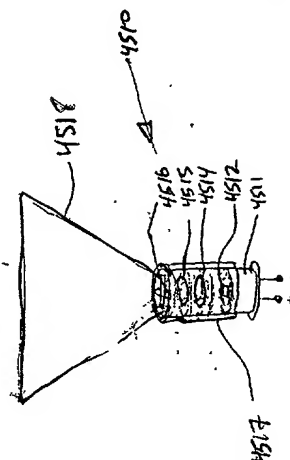


FIG. 66A

# Baggage check-in Station #1

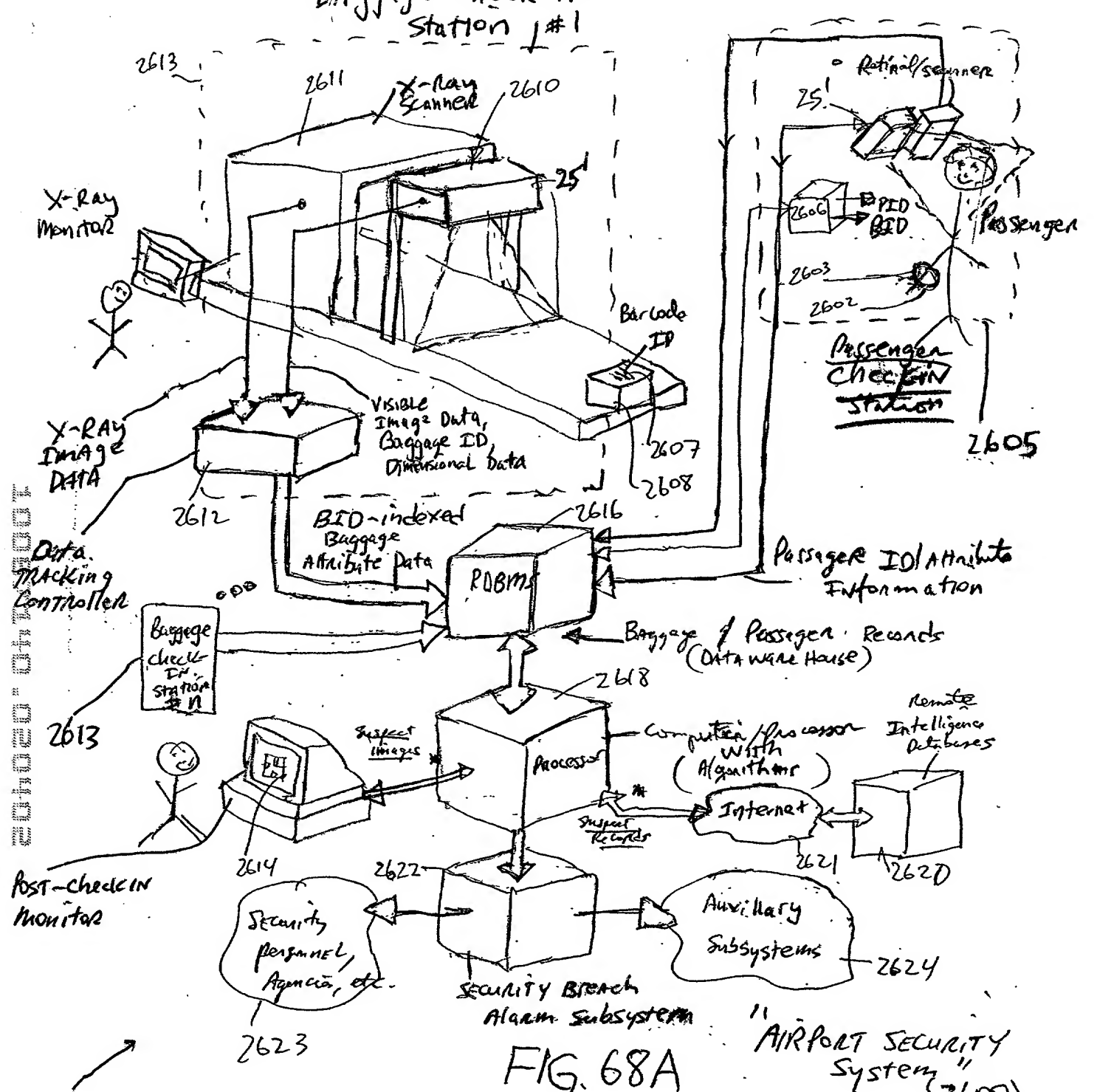


FIG. 68B

RDBMS Record X

Attribute Data	2621
Passenger ID #	2620
Baggage ID #	2622
Baggage ID #	2622